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MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989

HEARING

BEFORE THE

SUBCOMMITTEE ON THE CONSUMER

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

S. 1224

TO AMEND THE MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT TO REQUIRE NEW STANDARDS FOR CORPORATE AVERAGE FUEL ECONOMY, AND FOR OTHER PURPOSES

SEPTEMBER 7, 1989

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MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989

THURSDAY, SEPTEMBER 7, 1989

U.S. Senate,
Committee on Commerce, Science, and Transportation,
Subcommittee on the Consumer,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:30 a.m., in room SR-253, Russell Senate Office Building, Hon. Richard Bryan (chairman of the subcommittee) presiding.

Staff members assigned to this hearing: Linda Lance and Kevin Curtin, staff counsels; and Alan Maness, minority staff counsel.

OPENING STATEMENT BY SENATOR BRYAN

Senator Bryan. Good morning. I welcome all of you to this hearing of the Consumer Subcommittee on S. 1224, legislation which I introduced to increase corporate average fuel economy, or CAFE standards, for passenger cars and light trucks sold in the United States.

I am very pleased to have the support of the Chairman of the Commerce Committee, Senator Hollings, and the ranking Republican on the Consumer Subcommittee, Senator Slade Gorton, as well as my fellow members of the Commerce Committee, Senator Inouye and Senator Gore, all of whom are co-sponsors of this legislation.

My interest in this issue is grounded upon two concerns that I know are shared by all Americans: one, our increasing dependency on unstable foreign supplies of oil and two, the alarming increase in air pollution and carbon dioxide emissions.

America has felt the sting of energy dependence before. We all remember the gas lines—the requirement to buy gasoline on certain days—and our worry that our vacations could be curtailed because of a lack of supply.

Those gas lines existed not so long ago, and while we in the United States no longer wait anxiously every time OPEC meets in Vienna, with every tanker coming into an American port, America is becoming more dependent upon imported oil. That dependency is projected to reach 50 percent of our petroleum requirements by the early 1990s.

Concern over increasing energy dependence alone would be enough to demand that we strive to continue to increase our fuel efficiency, but we have the specter of an environment threatened by increasing concentration of greenhouse gases, with potentially severe environmental consequences.

One of those gases, CO_2, contributes as much to global warming as all of the other greenhouse gases combined. The United States is responsible for 20 percent of the world's CO_2 emissions with just 5 percent of the world's population, and U.S. CO_2 emissions from gasoline alone are greater than the CO_2 emissions from all sources—from all sources—in each of the following regions: Latin America, Japan, the Middle East, West Germany, Southeast Asia, the United Kingdom, Africa, and France.

The staff of the Department of Transportation has calculated that this legislation will save 49.1 billion gallons of fuel between 1995 and 2001. Since each gallon of gasoline burned emits about 20 pounds of carbon dioxide, S. 1224 will also save over 483 million tons of CO_2 during the same period.

There should be no disagreement today about the benefits of such an achievement. There is, however, I think general agreement that the market alone will not take this country where we need to go in this area.

There is conclusive evidence from our experience with the current CAFE legislation that setting standards is effective. Indeed, the automobile industry's response to the current law is nothing short of spectacular.

The industry has doubled the fuel economy of the passenger car fleet with no reduction in the interior volume of the vehicles and with an increase in performance. However, current law requires no improvement beyond the 1985 standard of 27.5 miles per gallon.

Technology and industry ingenuity is not, and should not be, frozen at the present level. The purpose of my legislation is to ensure that the improvement which already has begun continues as rapidly as is reasonable.

S. 1224 requires each manufacturer to improve its 1988 cafe level by an equal percentage. It sets higher standards, beginning in the model years 1995 and 2001. The result is fleet averages for passenger automobiles of approximately 34 miles per gallon by 1995 and 40 miles per gallon by 2001.

These levels attempt to strike a reasonable balance between the ambitious work necessary to address the crises that we face as a Nation and the needs of the industry and of the American consumer.

We have current data from the Office of Technology Assessment as well as from other sources which shows the standards set by this bill are achievable using existing technology.

There also is good evidence that, given the level of effort that this issue deserves and the obvious talent of the automobile industry, these levels can be achieved with minimal change in the size mix or performance of vehicles from that of recent model years and at a reasonable cost to the American consumer.

However, it is clear we must move quickly or our opportunity to achieve these levels becomes more costly, if not impossible. Some will suggest today that 1995 is too soon to impose these requirements for substantial improvements, given the product planning cycles of the industry.

We will examine that issue very carefully during the course of this hearing. However, when the current law was enacted, that law required improvements averaging 4 miles a gallon beginning 3 years after the enactment of the legislation.

It required a doubling of the fleet fuel economy and an improvement of 14 miles per gallon within ten years of enactment. The industry strongly warned at that time they could not meet those standards.

In fact, the statutory standards have been met and none of the dire consequences predicted came true. Now we must improve this impressive track record into the next decade and beyond. We know that we have to run just to stay in place, because vehicle miles traveled in this country are increasing by at least 2 percent a year. Just to maintain the status quo in carbon dioxide emissions and gasoline consumption we will have to dramatically improve fuel economy.

This is the second hearing the Subcommittee has held this year on the issue of fuel economy. In May, we obtained general information from Executive Branch agencies, from the Office of Technology Assessment and from the industry and other concerned organizations. That hearing provided much of the data for preparation of the legislation that we will discuss today.

Today, we will hear from many groups who could not be with us in May. In the interest of time, we have asked the Departments of Transportation and Energy, the Environmental Protection Agency and the Office of Technology Assessment for written information relevant to this bill.

I look forward to hearing from today's witnesses. I want to assure the industry, auto workers, suppliers, environmental groups and others concerned with this legislation that we want to work with you as well.

We must, however, at the same time keep our sights set on the ambitious goals necessary to secure the future for this Nation and the world.

We hope that all aspects of the industry realize the importance of these conservation efforts. If they do, I am confident that we will work together to achieve a balanced piece of legislation that yields the impressive results which are required.

Due to the wide range of interests affected by this bill, we have many people here to testify. Therefore, I would like to ask each of the witnesses to observe a five-minute rule in your testimony. We ask you to summarize your written testimony, which will be placed in the record in its entirety, and I thank all witnesses in advance for their cooperation in assisting us here today.

Senator Gorton?

OPENING STATEMENT BY SENATOR GORTON

Senator GORTON. Thank you, Mr. Chairman. This hearing on S. 1224 is, I hope, going to be a very important element in progress toward dealing with a vitally important problem to the people of the United States and the world.

I was pleased to join with you in introducing legislation to increase the corporate average fuel economy standards for passenger cars and light trucks.

S. 1224 is an important step toward reducing vehicle emissions of carbon dioxide, a primary greenhouse gas, lessening our dependence on foreign oil and preserving environmentally sensitive areas. When Congress first established vehicle fuel efficiency standards in 1975, the average fuel economy of cars being sold in the United States was 14 miles per gallon.

Our goal was to increase the fleet's average fuel economy up to 27½ miles per gallon by 1985. We achieved that goal, but since that time fuel economy has leveled off. Moreover, we have seen many consumers shift from passenger cars to relatively low mileage light trucks.

A leveling of vehicle fuel economy is not good enough. Economic and environmental concerns dictate that we become much more efficient in our use of fossil fuels. S. 1224 would start us moving toward greater efficiency. S. 1224 sets realistic targets for fuel efficiency, improvements for automobiles and light trucks, but will not stifle economic growth.

The 20 percent goal for 1995 of the 40 percent goal for 2001 can be achieved in large part by more aggressive use of currently available technologies. Although the bill's targets are relatively modest, the benefits of achieving these targets would be spectacular.

According to an estimate prepared by DOT staff, the increase in fuel economy would reduce carbon dioxide emissions over the life of the cars and light trucks affected by more than 400 million tons. It will also reduce our need to produce or import fuel by more than 41 billion gallons.

These gains are important, even though the country seems to have been lulled into complacency about our energy and environmental security. This complacency is undeserved, because we are now importing more than 50 percent of our oil.

Moreover, such complacency is particularly dangerous when it comes to protecting our environment. The *Exxon Valdez* incident should remind us of the perils of opening up environmentally sensitive areas to oil and gas development.

One must also keep these dangers in mind in reviewing the Administration's outer continental shelf oil and gas leasing program currently planned for the waters off of Oregon and Washington.

Again, Mr. Chairman, I want to thank you for calling this important hearing.

Senator BRYAN. Thank you very much, Senator Gorton.

Senator Gore?

OPENING STATEMENT BY SENATOR GORE

Senator GORE. Mr. Chairman, thank you very much, and let me start by commending you for holding this hearing today on the future fuel efficiency of our Nation's vehicles.

I am pleased to be an original co-sponsor of your bill, S. 1224. I am proud to join you in this effort which promises, I believe, to ultimately benefit our Nation's economy, our Nation and the world's environment, and national security.

The approach taken in the bill that is the subject of these hearings, a percentage increase in vehicle fuel efficiency on a manufacturer by manufacturer basis, is the approach taken in legislation S. 201 that I introduced on the first day of this Congress back in January. I was honored that you and Chairman Hollings and other colleagues joined as cosponsors of that bill.

It called for a 65 percent increase over the 1989 model year by the year 2000. I understand and respect that the different figures in this bill, which seeks to achieve a 40 percent increase by the same time—or rather, by the year 2001.

I do feel that concerns about the environment, the trade balance and our own ability to compete as a technological world leader demand that we strive to obtain the highest efficiency goal possible.

In the end, the bottom line is that our Nation must reverse the trend toward higher fuel consumption in our transportation sector, reduce our dependence on oil that increasingly chokes our cities, pollutes our oceans and threatens our national security.

The way we resolve this issue will have an impact on the quality of the world's environment, the competitiveness of our Nation and our dependence on the resources of other countries.

I consider it to be of primary importance, and as we move into the 1990s concerns about global climate change will require our Nation to enter into negotiations with other countries in an effort to reduce the world's emission of greenhouse gases.

The other nations will rightly demand that the United States, the largest emitter of greenhouse gases, demonstrate leadership by showing a willingness to attack our own contributions to the problem.

The fact is, Mr. Chairman, we in the United States emit more greenhouse gases in our transportation sector alone than any other nation in the world does in all of its economic activities put together.

So as we look to the time of coming very shortly when we are going to seek to offer world leadership in dealing with the most serious environmental crisis we have ever faced in the world, how can we do so if we are not willing to tackle the one part of the problem that is most prominent here in the United States? I think a commitment to vast improvements in the efficiency of our vehicle fleet is an excellent first step to demonstrate that leadership.

But of course, Mr. Chairman, the issue before us is extremely complex and as I have examined the subtleties surrounding the issue and heard testimony in recent hearings, I have become intrigued by several ideas for enhancing our effectiveness as legislators and improving not only the efficiency of our vehicle fleet, but also the competitiveness of one of our Nation's most important industries.

I recognize that S. 1224 is the primary subject of today's hearings, but with your indulgence, Mr. Chairman, during these hearings I would like to also explore some of these ideas with our witnesses—some alternative approaches, some refinements, some different ideas that might be important additions to the approach we eventually take.

I know that in any event, here in the Commerce Committee, we will develop a strong proposal that effectively addresses this most important issue.

Now, I am going to, with your permission, put the rest of my statement in the record and conclude just by saying that if we are going to leave our children a legacy of care and stewardship we have got to begin accepting responsibility for the actions that contribute to the problem we are trying to address here.

Again, I applaud your leadership, Mr. Chairman, in focusing our attention on this particular part of the problem.

[The statement follows:]

OPENING STATEMENT BY SENATOR GORE

Mr. Chairman, I want to commend you for holding this hearing today, on the future fuel efficiency of our nation's vehicles. I am pleased to be an original co-sponsor of your bill, S. 1224. I am proud to join you in this effort, which promises to ultimately benefit our nation's economy, environment, and national security.

The approach taken in the bill that is the subject of these hearings, a percentage increase in vehicle fuel efficiency on a manufacturer-by-manufacturer basis, is the same approach taken in legislation that I introduced on the first day of this session, S. 201, The World Environment Policy Act of 1989. I am proud to have had you, Mr. Chairman, as well as Chairman Hollings and many other of my colleagues join me as co-sponsors of S. 201.

The legislation under discussion today, S. 1224, calls for each manufacturer to achieve a 40% increase in fuel economy over the 1988 model year by 2001. S. 201, on the other hand, calls for a 65% increase over the 1989 model year by 2000. I feel that concerns about the environment, the trade balance, and our own ability to compete as a technological world leader demand that we strive to attain the highest efficiency goal possible. In the end, the bottom line is that our nation must reverse the trend toward higher fuel consumption in our transportation sector, in order to reduce our dependence on oil that increasingly chokes our cities, pollutes our oceans, and threatens our national security.

Our resolution to this issue will impact the quality of our environment, the competitiveness of our nation, and our dependence on the resources of other countries. I consider it to be of primary importance for these reasons, and for another: as we move into the 1990's, concerns about global climate change will require our nation to enter negotiations with other countries in an effort to reduce the world's emissions of greenhouse gases. Those other nations will rightly demand that the U.S., the world's largest emitter of greenhouse gases, demonstrate leadership. A commitment to vast improvements in the efficiency of our vehicle fleet is an excellent first step to demonstrate that leadership.

But Mr. Chairman, the issue before us today, vehicle fuel efficiency, is an extremely complex one. And as I have examined the subtleties surrounding this complex issue, and heard testimony in recent hearings, I have been intrigued by several ideas for enhancing our effectiveness as legislators in improving not only the efficiency of our vehicle fleet, but also the competitiveness of one of our nation's most important industries.

I recognize that S. 1224 is the primary subject of today's hearings. But with your indulgence, Mr. Chairman, I would like to explore some of these ideas with our witnesses. I know that here in the Commerce Committee we will develop a strong proposal that effectively addresses this most important issue.

Mr. Chairman, we still live with almost daily reminders of our nation's worst oil spill, a disaster that spoiled the pristine waters of Prince William Sound. We are still saddened by the death and despoilation of an environmental disaster that did not have to happen.

Many of us have heeded the call to be better stewards of the atmosphere, the water, and the land. We have learned that the environment is not just an infinite void into which we can discharge our pollution. If we continue to do so, we threaten the delicate balance that is the planet's ability to support life.

The oil that killed the wildlife and fish of Prince William Sound, and destroyed the livelihood of the surrounding communities, was probably destined for our vehicles. Once burned, its emissions would have been dumped into our environment in another form, polluting the air in our cities and contributing to the changing of our planet's climate.

We have heard calls for global cooperation to protect the world's environment. But that protection must begin here at home. Our cars and trucks are responsible for much of the air pollution choking our cities, and a large portion of the carbon dioxide emissions of our nation.

Thus, one of the first steps to demonstrate U.S. leadership in protecting the global environment must be to increase the efficiency of our transportation sector. Each American consumes more energy in the single activity of transportation, than a person in almost any other country consumes in all activities combined. We do not need to speed development of environmentally sensitive areas to produce more oil for our vehicles; we can "produce" that oil in an environmentally and economically sound way, through increased vehicle fuel efficiency.

After dramatic improvements in the 1970s, and general stability in the 1980s, average new vehicle efficiency in 1988 was actually lower than the standards set originally for 1985. The average new vehicle produced in the U.S. got 27 miles per gallon in 1988; the average Asian import got 32 miles per gallon. The trend away from improved vehicle fuel efficiency has been hastened by another trend during the 1980s, back toward higher horsepower; in effect, the fuel efficiency wars of the 1970s have been replaced by the horsepower wars of this decade.

Clearly, improvements in vehicle fuel efficiency are long overdue, and they make sense for a variety of reasons:

Oil imports cost our trade balance $40 billion in 1988; for every one mile-per-gallon increase in the efficiency of our nation's car and light truck fleet, we could reduce oil imports by 320,000 barrels per day—even at only $12 per barrel, that's $1.5 billion off our trade deficit each year.

Our national security is threatened by an over-reliance on those oil imports to fuel the majority of the entire U.S. transportation sector.

Our competitiveness in international markets is compromised by energy-inefficient products in a world where continued depletion of finite oil resources can only lead to increased fuel costs.

Our vehicle fleet contributes as much as one-third of U.S. carbon dioxide emissions (overall, our nation emits more carbon dioxide than any other nation in the world).

Last but not least, urban air quality in many cities is not coming into compliance with standards deemed necessary to avoid adverse impacts on human health. Among the major pollutants addressed by the Clean Air Act, the two that have proven most difficult to control—carbon monoxide and ozone—are largely due to our automobiles. Over 100 urban areas are not meeting air quality standards for one or both of these pollutants.

Our addiction to the Middle East's oil is again on the rise. Our trade balance is again on the decline. Our national security is at stake, and the environment demands our stewardship.

Burning less fuel in our vehicles is one sure way to meet all of these demands. And as we address this issue, we must realize that burning less fuel in our vehicles means not only driving more efficient vehicles; it also means stemming growth in the number of miles we drive. The Federal Highway Administration projects that in urban areas, the total number of miles traveled by vehicles will increase 50% to 80% by the year 2010. New vehicle fuel efficiency standards are the first component of reducing the fuel consumed by our vehicles. But a re-thinking of urban and suburban transportation must be the second component.

Mr. Chairman, just as new commitments to clean up the environment were being sounded around the world, just as new international initiatives were being forged to protect our planet, eleven million gallons of crude oil pierced an ecological treasure. The disaster that occurred in Price William Sound, and the polluted air that chokes our cities, must be remembered by all of us as we debate legislation such as S.1224. If we are to leave our children a legacy of care and stewardship, we must take responsibility for the entire planet. Each of us must find within ourselves the foresight and the courage to confront this serious global challenge.

Senator **Bryan**. Thank you very much, Senator Gore.

For the record, Chairman Hollings has asked for a statement to be included and made a part of the record, which it will.

[The statement and bill follow:]

OPENING STATEMENT BY THE CHAIRMAN

I am pleased that we are continuing today the work we began in the 1970's on fuel economy for the passenger fleet. I cosponsored legislation that, in 1975, established the current corporate average fuel economy, or CAFE, standards. At the time that legislation was proposed it was an untested plan—to promote national energy secruity by mandating that the passenger vehicle fleet achieve a certain fuel economy. We heard frightening predictions from the automobile industry about the consequences of such regulation on the U.S. economy and on the consumer's choice of vehicles. It was suggested, for example, that if the current standards were enacted everyone would have to drive a vehicle the size of a Ford Pinto. Of course, the events of the last decade have proven the absurdity of those predictions, and have demonstrated the ability of the automobile industry to meet a challenge.

I'm glad we weren't deterred by the 1975 predictions, and that we proceeded to legislate fuel economy standards. Those standards have made a significant contribution to energy conservation, and I take great pride in that legislation.

In addition to the ongoing, and, indeed, increasing, problem of national energy security, we now have another reason to continue the progress in this area—the threat of global warming. Every gallon of gasoline that is burned emits 20 pounds of carbon dioxide, and we know that carbon dioxide is a primary contributer to global warming. While we may not be certain of the consequences of the warming that's predicted, we are certain that concentrations of carbon dioxide are increasing. I am working to enhance the research necessary to know more about the effects of this warming. Earlier this year I introduced S. 169, the National Global Change Research Act of 1989. This legislation, which has been reported favorably by the Commerce Committee, would provide for improved coordination of the national research efforts to understand the Earth system and effects of changes in that system. This legislation also would provide for a national plan to advance this research.

However, I am convinced that, while this research proceeds, we must immediately take certain measures available to us to reduce carbon dioxide emissions. Since the transportation sector is responsible for about one-third of the country's carbon dioxide emissions, fuel economy is an important part of the solution to this problem.

I am pleased to join my colleague Senator Bryan in sponsoring S. 1224, which will continue the important work we started in 1975. No improvement in fuel economy has been required since 1985, and new requirements are overdue. I look forward to hearing from the witnesses here today, and I welcome their assistance in completing the work necessary to enact reasonable new standards into law.

101st CONGRESS
1st Session

S. 1224

To amend the Motor Vehicle Information and Cost Savings Act to require new standards for corporate average fuel economy, and for other purposes.

IN THE SENATE OF THE UNITED STATES

June 22 (legislative day, January 3), 1989

Mr. Bryan (for himself, Mr. Hollings, Mr. Gorton, and Mr. Lieberman) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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A BILL

To amend the Motor Vehicle Information and Cost Savings Act to require new standards for corporate average fuel economy, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Motor Vehicle Fuel Efficiency Act of 1989".

FINDINGS

Sec. 2. The Congress finds and declares the following:

(1) Improved efficiency in the consumption of petroleum is vitally important, not only because the worldwide supply is finite, but becaue the increasing

dependence of the United States on foreign oil is a threat to our national security and adversely affects the trade balance.

(2) The light duty vehicle fleet is a significant user of oil, accounting for about 39 percent of United States oil consumption.

(3) Improvements in vehicle fuel efficiency between 1973 and 1987 amounted to a savings of one million eight hundred thousand barrels of oil per day and a savings to drivers of close to $30,000,000,000. Conversely, the rollback of the corporate average fuel economy (CAFE) standard for the 1989 model year, from 27.5 miles per gallon to 26.5 miles per gallon, is expected to result in increased consumption of nine hundred million gallons of fuel over the life of the vehicles.

(4) Emissions of carbon dioxide, including those from the light duty vehicle fleet, contribute substantially to increased retention of heat in the Earth's atmosphere and may cause long term global warming and disruption of climate-dependent activities.

(5) The United States, with only 5 percent of the world's population, is responsible for 20 percent of world carbon dioxide emissions. United States carbon dioxide emissions from gasoline alone are greater than

the carbon dioxide emissions from all sources in each of the following countries and areas of the world: Latin America, Japan, the Middle East, West Germany, South and Southeast Asia, the United Kingdom, Africa, and France.

(6) The Transportation sector is responsible for 31 percent of carbon dioxide emissions in the United States. Each gallon of gasoline burned results in the emission of 19.7 pounds of carbon dioxide.

(7) The rollback of the CAFE standard for the 1989 model year is projected to result in nine million tons of additional carbon dioxide emissions during the life of the vehicles involved.

(8) Increased numbers of vehicles and vehicle miles traveled in the United States will necessitate a 3 percent annual increase in fuel efficiency merely to hold future carbon dioxide emissions at current levels. Therefore, substantial improvements in vehicle fuel efficiency will be needed to reduce these emissions.

(9) CAFE standards and the successful response of automobile manufacturers to those standards have been very effective in increasing vehicle fuel efficiency, resulting in a doubling of the passenger car fleet fuel economy between 1975 and the present. However, current law does not require improvement above a

standard of 27.5 miles per gallon which became effective in 1985.

(10) Light trucks were an insignificant part of the passenger vehicle market when CAFE standards were enacted in 1975, and have not been subjected to strict, legislatively established, CAFE standards. As a result, there have been few major technological changes related to fuel efficiency in the standard size light trucks since 1982, and fuel economy in some light truck models has actually declined between 1982 and 1986. Light trucks have become increasingly popular for passenger use, and such vehicles now account for approximately one-third of new passenger vehicle sales.

(11) The Office of Technology Assessment and the Department of Energy agree that increased fuel efficiency is possible utilizing currently available technology and without significant changes in the size mix or performance of the fleet. Using conventional technologies, it is estimated that the fuel economy of the entire new care fleet could range from thirty-three to thirty-eight miles per gallon by 1995.

(12) Over the long term, by utilizing technology currently in production or in prototype, additional increases in fleet fuel economy beyond 1995 estimates

are achievable, from forty miles per gallon to as high as sixty miles per gallon in the next decade.

(12) Gasoline prices currently are lower in real dollars then they have been since the early 1970's. Since there is at least some correlation between gasoline prices and consumer demand for fuel efficient vehicles, it is unlikely that the market alone will achieve significant improvement in fuel economy.

(13) Increased CAFE standards are, therefore, both reasonable and necessary to ensure that improvements in fuel efficiency continue in furtherance of the dual goals of the Nation's energy security and decreased carbon dioxide emissions.

AVERAGE FUEL ECONOMY STANDARDS

SEC. 3. (a) Section 502(a) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(a)) is amended by striking:

"1985 and thereafter	27.5."

and inserting in lieu thereof the following:

"1985 through 1994	27.5
1995 and thereafter	As provided in accordance with section 514 of this Act.".

(b) Section 502(a)(4) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(a)(4)) is amended by striking "The Secretary" and inserting in lieu thereof "Except in the case of standards established by section 514 and 515, the Secretary".

LIGHT TRUCKS

SEC. 4. Section 502(b) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(b)) is amended by inserting "and which ends before model year 1995" immediately after "after the date of enactment of this title".

EXEMPTIONS FOR LIMITED PRODUCTION

SEC. 5. Section 502(c)(1) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(c)(1)) is amended—

(1) by striking "passenger" each place it appears;

(2) by inserting "or subsection (b) or section 514 or 515" immediately before the period at the end of the first sentence; and

(3) by inserting "subsection (b) or sections 514 and 515" immediately before "is more stringent".

EMERGENCY VEHICLES

SEC. 6. Section 502(g)(1) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(g)(1)) is amended by inserting "or section 514 or 515" immediately before the period at the end of the first sentence.

CONSULTATION

SEC. 7. Section 502(i) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(i) is amended by inserting "or sections 514 and 515" immediately before the period in the first sentence.

NOTIFICATION

SEC. 8. Section 502(j) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2002(j)) is amended by inserting “or sections 514 and 515” immediately before “or any modification”.

NEW STANDARDS

SEC. 9. (a) Title V of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2001 et seq.) is amended by adding at the end of the following new sections:

“PASSENGER AUTOMOBILES

“SEC. 514. Notwithstanding any other provision of this Act, the average fuel economy for passenger automobiles manufactured by any manufacturer in model year 1995 and each model year thereafter shall not be less than the number of miles per gallon established for such model year pursuant to the following:

“Model year:	
“1995 through 2000	For each such manufacturer, the average fuel economy required shall be an amount determined by the Secretary to be equal to the average fuel economy achieved by that manufacturer for passenger automobiles in model year 1988, plus an amount equal to 20 percent (as measured in miles per gallon) of such average fuel economy achieved for model year 1988; except that such standard shall not be less than 27.5 miles per gallon and shall not exceed forty miles per gallon.

"2001 and thereafter	For each such manufacturer, the average fuel economy required shall be an amount determined by the Secretary to be equal to the average fuel economy achieved by that manufacturer for passenger automobiles in model 1988, plus an amount equal to 40 percent (as measured in miles per gallon) of such average fuel economy achieved for model year 1988; unless such standard is modified under section 516; except that such standard shall not be less than 27.5 miles per gallon and shall not exceed forty-five miles per gallon.

"AUTOMOBILES OTHER THAN PASSENGER AUTOMOBILES

"SEC. 515. Notwithstanding any other provision of this Act, commencing with model year 1995 and each model year thereafter, the average fuel economy for passenger automobiles other than passenger automobiles manufactured by any manufacturer in any such model year shall not be less than the number of miles per gallon established for such model year pursuant to the following:

"Model year:	
"1995 through 2000	For each such manufacturer, the average fuel economy required shall be an amount determined by the Secretary to be equal to the average fuel economy achieved by that manufacturer for light trucks in model year 1988, plus an amount equal to 20 percent (as measured in miles per gallon) of such average fuel economy achieved for model year 1988; except that such standard shall not be less than twenty miles per gallon and shall not exceed thirty miles per gallon.

"2001 and thereafter	For each such manufacturer, the average fuel economy required shall be an amount determined by the Secretary to be equal to the average fuel economy achieved by that manufacturer in model 1988, plus an amount equal to 40 percent (as measured in miles per gallon) of such average fuel economy achieved for model year 1988; unless such standard is modified under section 516; except that such standard shall not be less than twenty miles per gallon and shall not exceed thirty-five miles per gallon.

"MODIFICATIONS OF STANDARDS

"SEC. 516. (a) Any time after the beginning of fiscal year 1995, any person may petition the Secretary to modify any average fuel economy standard established under this Act for model year 2001 and thereafter. In response to such a petition, the Secretary may increase or decrease such standard to the level which the Secretary determines is the maximum feasible average fuel economy for the relevant model year (taking into consideration the factors listed in section 502(e)), except that the Secretary shall not reduce any such standard below a standard equal to a 30 percent increase over the average fuel economy achieved by the manufacturer involved for the applicable type (or class) of vehicles for model year 1988. Any such petition shall be filed at least twelve months in advance of the model year to which it is applicable. Upon receipt of such a petition, the Secretary shall conduct a rulemaking proceeding, which shall be conducted in accordance with the following procedure:

"(1) The Secretary—

"(A) shall publish an advance notice of proposed rulemaking which specifies the type (or class) of vehicles to which the rule may apply;

"(B) shall invite interested persons to submit, within sixty days after the date of publication of such advance notice, written presentations of data, views, and arguments in response to such notice; and

"(C) may identify proposed or amended standards that may be prescribed.

"(2) A proposed rule which prescribes an amended average fuel economy standard, or prescribes no amended standard, for a type (or class) of vehicles shall be published in the Federal Register. In prescribing any such proposed rule with respect to a standard, the Secretary shall consider the four factors listed in section 502(e) and shall determine the maximum improvement in energy efficiency or maximum reduction in energy use that is technologically feasible for each type (or class) of vehicles. If such standard is not designed to achieve such maximum improvement or maximum reduction, the Secretary shall state in the proposed rule the reasons therefor.

"(3) After the publication of the proposed rulemaking, the Secretary shall afford interested persons an opportunity, during a period of not less than sixty days, to comment on matters relating to the proposed rule.

"(4) A final rule prescribing an amended average fuel economy standard, or prescribing no amended standard, for a type (or class) of vehicles shall be published as soon as is practicable, but not less than one hundred and twenty days, after publication of the proposed rule in the Federal Register.

"(b) In determining the maximum feasible average fuel economy during a rulemaking proceeding under this section, the Secretary shall evaluate the economic practicability of the standard, considering—

"(1) the economic impact of the standard on the manufacturers and on the consumers of the vehicles subject to such standard;

"(2) the savings in operating costs throughout the estimated average life of the vehicle in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of, the vehicles which are likely to result from the imposition of the standard;

"(3) the total projected amount of energy savings likely to result directly from the imposition of the standard;

"(4) any lessening of the utility or the performance of the vehicles likely to result from the imposition of the standard;

"(5) the impact of any lessening of competition or any change in foreign trade that is likely to result from the imposition of the standard;

"(6) the need for reducing carbon dioxide emissions to mitigate the global greenhouse warming, as well as reducing other environmentally damaging energy-related pollutants;

"(7) the need for national energy conservation; and

"(8) other factors the Secretary considers relevant.".

FUEL ECONOMY TESTING

SEC. 10. (a) The Administrator of the Environmental Protection Agency shall conduct a study on the accuracy of fuel economy testing of passenger automobiles by the Administrator performed in accordance with procedures in effect as of the date of enactment of this Act, as compared to the actual performance of such automobiles when driven by average drivers under average driving conditions in the United States. In the course of such study, the Administrator shall, for each model type and year—

(1) measure the fuel economy of a sampling of production passenger automobiles during the first month of manufacture for sale; and

(2) repeat, over a period of years to be determined by the Secretary of Transportation, the measurements and calculations under section 503(d)(1) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2003(d)(1)), for purposes of monitoring automobile performance in use to determine the extent, if any, of decline in fuel economy after such use.

(b) The Administrator shall, within twelve months after the date of enactment of this Act and annually thereafter, submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Energy and Commerce of the House of Representatives a report on the results of the study required by subsection (a) of this section. The report shall include—

(1) a comparison between (A) fuel economy measured, for each model in the applicable model year, through testing procedures in effect as of the date of enactment of this Act and (B) fuel economy measured in accordance with subsection (a)(1) of this section;

(2) a statement on any decline in fuel economy determined through repeat measurements and calculations under subsection (a)(2) of this section; and

(3) any recommendations for legislative or other action.

(c) To the maximum extent practicable, the Administrator shall, in carrying out measurements under subsection (a) (1) and (2) of this section, simulate average drivers and average driving conditions in the United States.

(d) As used in this section, the term "production passenger automobile" means a passenger automobile manufactured for sale.

EXPLANATORY BOOKLET DISTRIBUTED BY SECRETARY OF ENERGY

SEC. 11. (a)(1) Paragraph (1) of section 506(b) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2006(b)) is amended by adding at the end the following new sentence: "The Secretary of Energy shall distribute no less than one hundred booklets each year to each dealer and shall distribute as many in addition to one hundred booklets as are reasonably requested by dealers from time to time.".

(2) The amendment made by paragraph (1) of this subsection shall apply to the twelve-month period beginning on the first day of the first month after the date of enactment of this Act and corresponding twelve-month periods thereafter.

(b) Section 506(e) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2006(e)) is amended by striking "Federal Energy Administrator" and inserting in lieu thereof "Secretary of Energy".

STUDY

SEC. 12. (a) The Secretary of Transportation shall provide for a review to be undertaken by the National Academy of Sciences, in consultation with vehicle manufacturers, representatives of environmental and consumer groups, appropriate State and local officials, and representatives of labor, of the current state of research and development in light truck fuel economy and passenger automobile fuel economy and an assessment of the remaining potential for improving the fuel efficiency and reducing the energy consumption of passenger automobiles and light trucks. The assessment shall include all aspects of vehicle design, including engines, drive train, component parts, auto body, tires, and any other aspect contributing to the reduction of energy consumption. The National Academy shall, not later than two years after the date of enactment of this Act, submit a report to the Congress on the results of the review and assessment and in the report recommend research and development priorities that could result in the commercialization of fuel economy technology through the early years of the next century. The National Academy shall update the report every five years, beginning not later than seven years after the date of enactment of this Act, and shall submit each updated report to Congress.

(b) As used in this section, "passenger automobile" and "light truck" have the meaning given those terms under section 501 of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2001), as amended by this section 4 of this Act.

REPEATED VIOLATIONS OF AVERAGE FUEL ECONOMY STANDARD

SEC. 13. (a) Section 508(b)(1) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2008(b)(1)) is amended by adding at the end the following new subparagraph:

"(C) Any civil penalty assessed under this subsection for a violation of section 507(a) (1) or (2) in model year 1995 or thereafter against a manufacturer shall be doubled if—

"(i) the manufacturer violated section 507(a) (1) or (2) in the two model years immediately preceding the model year involved in the assessment; and

"(ii) during each of such preceding years and the year involved in the assessment, the applicable average fuel economy standard exceeded the average fuel economy of the vehicles manufactured by such manufacturer by five-tenths of a mile per gallon or more.".

(b) Section 507(a)(1) of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2007(a)(1)) is amended by inserting "including sections 514 and 515," immediately after "section 502(b)),".

* * *

Senator BRYAN. Senator Metzenbaum was scheduled to be our first witness this morning, but because of an unexpected conflict he may not be able to join us. We will take him when he arrives, as soon as he is able to make it, but we are joined this morning by one of our colleagues, Senator Nickles, and we will hear from you this morning. Good morning, Senator.

STATEMENT OF HON. DON NICKLES, U.S. SENATOR FROM OKLAHOMA

Senator NICKLES. Thank you, Mr. Chairman. I have a several page statement. I will ask that it be inserted, and I will just make a few brief remarks concerning the legislation.

Senator BRYAN. That will be the order.

Senator NICKLES. One I want to make at the outset is that I certainly agree with the goal that you enumerated. I certainly join you. I would like to have more fuel efficient automobiles, trucks. I would like to see us decrease our dependency on imports. They are rising, and rising very rapidly.

As you may be aware, we actually imported more oil last month than we produced domestically. I think we imported something like 8.6 million barrels of crude per day and we produced domestically less than 8 million barrels per day, and so that concerns me, being from an oil state. But it also concerns me the fact that we are paying for that oil. It is very expensive.

I also share some of your concerns that you mention concerning the emissions and the greenhouse effect, so I do not disagree with the stated objectives. We want to decrease imports, we want to have a cleaner environment, and we certainly want more fuel efficient automobiles.

I do disagree with the direction that is under CAFE. In other words, the mandate that automobiles have to have so many miles per gallon by such and such date, and if not they are penalized rather significantly or severely, and therefore, what happens?

Well, automobile manufacturers make changes. They change the mix of the automobiles. They discontinued producing larger automobiles and produced smaller automobiles. Most people say that would be fine. That may be, but let us let the consumer have an input. Let us let demand have an input.

I think most of the speakers talked about the increased fuel efficiency and how great that is, and we acted like that came about as a result of CAFE. I would venture to say it came about more as a result of increasing gasoline prices and the market.

People were demanding more fuel-efficient cars, and I think if you see an increase in gasoline prices in the future you will see increasing fuel efficiency in automobiles. I do think that they go hand-in-hand.

I am concerned about what happens to the consumer. I am concerned that if we have very high mandates—congressionally-mandated high CAFE standards—that you are going to see the automobile manufacturers trying to change the mix by increasing cost rather dramatically on large automobiles.

That may be fine for some, but for others they may need a large automobile. They may have a family with four or five kids. I happen to have four kids, a family of six. We happen to have a station wagon. I think new station wagons are very expensive.

So you would see automobile manufacturers, to decrease the number of larger cars sold they would increase the prices, and again, that can be very punitive on a lot of families in the United States.

So there is consumer impact, and I understand this is a Consumer Subcommittee. I would hope that you would talk to the automobile manufacturers who are scheduled to testify today and ask them about increased cost. How much will it cost per automobile to meet some of these standards?

Again, I hope that we meet these standards, but I have a real objection to saying if we do not meet these standards, the automobile—the penalties imposed on the automobile manufacturer would be so severe that they will meet them, basically, by increasing prices or mix.

I am also concerned that the increase on prices may make it prohibitively expensive for people to purchase automobiles; therefore, they will not purchase automobiles and they will continue driving their old gas guzzlers. So instead of buying a newer automobile at 20 or 25 or 30 miles per gallon, they will continue driving an older, obsolete, less fuel efficient car that maybe gets 8, 9 or 10 miles per gallon. I think that is something that needs to be kept in the equation as well.

I am concerned about jobs. I think if you pass the bill as written, it would increase the mandates for CAFE standards and that you are going to cost American jobs. I hope that you will ask the automobile manufacturers and others who are experts what the cost will be; will they close plants; will they have to close plants; will they have to increase exports.

Will the bill as written give more of an advantage to foreign automobile manufacturers than domestic automobile manufacturers? I believe that it would. I do not think that Toyota and Honda have the CAFE problems that Ford and GM have domestically; therefore, I think actually the result would be increased foreign automobiles and decreased domestic production.

I also think you will see domestic producers increasing their production overseas. Really, I think we have already seen that happen with Ford. I think you will see it happening with other automobile manufacturers. I do not want that to happen. I do not want Oklahoma automobile workers to lose their jobs. I do not want to see Ohio auto workers lose their jobs as a result of legislation.

Also, Mr. Chairman, I will bring up the point of safety. I happen to be concerned about safety, as I am sure every Senator is. I can give you a personal incident of this. I have a couple of teenaged children. Unfortunately, they drive.

One of my kids was interested in a fuel efficient car, a rather economical car, and bought a Dodge Colt. My apologies to our friends from Chrysler, but that car is not a very safe car. She had an accident going 25 miles per hour and totaled the car. The car is fuel efficient, but it is not safe.

So I am concerned about safety, and I am concerned about the number of lives that will be lost if you want to increase fuel efficiency standards. It is interesting to note in your legislation that it would go to 20 percent by 95 and 40 percent by the year 2001. Senator Gore mentioned legislation that would increase the mandates to 65 percent improvement by the year 2000. You could introduce legislation to increase it to 100 percent by the year 2010, and I am sure that we could make it.

Now it may mean that we will all be driving something comparable to a Volkswagen, or maybe it would mean that we would be driving something comparable to a motorcycle. I am concerned about fulfilling consumer needs. I am concerned about consumer safety.

My son wanted to purchase a motorcycle because he had one of those old gas guzzlers, and I did not want him to purchase it. I did not allow him to purchase, with any assistance from me, a motorcycle because I did not think they were safe enough. Now that is my own personal belief, so I imposed, I guess, my own regulation in that regard. Certainly motorcycles are very fuel efficient, but I do not think they are very safe.

So I think consumers really should have a lot to say about the equation, and if we put unrealistically high mandates on the domestic automobile industry, one, I am concerned you are going to cost a lot of jobs, you are going to increase prices rather significantly, and you may well be increasing the number of lives that would be lost on our highways. I would just hate to see us do that. So I wanted to testify today to, one, let you know that I agree with a lot of your goals but I would encourage you as you work on this legislation to try to lessen the mandate and encourage the flexibility to make these goals a reality without the punitive hand of the Federal Government intervention.

Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF SENATOR DON NICKLES
BEFORE THE CONSUMER SUBCOMMITTEE OF THE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
HEARING ON S. 1224 - MOTOR VEHICLE FUELS EFFICIENCY ACT

September 7, 198

Mr. Chairman, Thank you for this opportunity to comment on legislation to expand the corporate average fuel economy (CAFE) standards. Congress passed the CAFE law in 1975 as part of the Energy Policy and Conservation Act in order to reduce our dependence on foreign oil. High world oil prices in the late 1970's, and the gasoline shortages in urban areas in 1979 created considerable consumer interest in more fuel efficient cars. Despite the fact U.S. car manufacturers have more than doubled the fuel efficiency of their new cars since 1975, the lower gasoline prices and apperant supply stability of the 1980's has contributed to a change in consumer priorities--demand which is being met in large measure by foreign cars. However, it is important to recognize that the change in purchasing patterns to larger, higher performance cars has had a relatively minor impact on the recent increases in our petroleum imports.

During the last month, the U.S. imported about 49% of its oil needs. This is an alarming fact. During the first 6 months of this year, we imported 62% more oil than we did the first 6 months of 1985. Is it because CAFE standards are too lax? No, we are importing more because we are producing less oil and consuming more oil in all sectors of the economy. Compared to the first six months of 1985, domestic oil production is down 14% and non-automotive uses for petroleum have increased, such as the 57% increase in the use of oil for electricity generation. Total U.S. gasoline use has increased only 7 percent since 1985--despite a 14% increase in motor vehicle miles driven in the U.S. Clearly, any policy aimed at protecting the U.S. from increasing dependency on foreign oil should be focused on increasing domestic oil production and reducing impediments for gradual introduction of alternative motor fuels into the market. The CAFE law has been at best, an inefficient mechanism to seek increased fuel economy, and increasing the CAFE standards is likely to cost the automobile consumer tens of billions of dollars and the industry tens of thousands of jobs for marginal reductions in oil imports.

I note that S. 1224 does not increase the CAFE standard of 27.5 miles per gallon, but instead requires that automakers improve their CAFE levels relative to their 1988 CAFE achievements. The use of a recent base period appears to mitigate the harm CAFE has been doing to U.S. automakers and their employees in their competition with Japanese automakers. However, S. 1224 penalizes companies that have aggressively implemented fuel saving technologies, because it will be particularly difficult for those companies to meet the 20% and 40% improvements called for in the bill without simply abandoning large car production.

Moreover, S. 1224 does not change the fundamental flaws in the CAFE law. First, CAFE does not work well when the consumer perceives that gasoline is in plentiful supply and is relatively inexpensive. In enacting the CAFE law in 1975, Congress forced the automakers to sell cars that met CAFE standards. This "backhanded" approach to increasing the fuel economy of the nation's automobile fleet worked while gasoline prices were high and consumers were concerned about gasoline supply. When gasoline prices began to lower in the early 1980's, however, Americans personal needs and priorities turned to cars with adequate room for their families, size for their safety concerns and performance for their needs or for quality of life reasons. Many of these people are likely to prefer older, less fuel efficient cars over high priced, smaller new cars or might switch to less fuel efficient vans and light trucks.

Secondly, S. 1224 sets improvement standards that appear to be well in excess of existing tecnhology. The Office of Technological Assessment has indicated that at the very best, the average fuel economy for all 1995 model year cars could be something less than 33 miles per gallon--which OTA admits does not take into account CAFE credits, and the mileage penalties of new safety and environmental regulations. Under S. 1224, Chrysler, with a 1988 fuel economy average of 28.4 will have to be at 34.08 by model year 1995, and 39.76 by model year 2001. It is my understanding that Chrysler has been increasing its average car size and adding performance, and this bill will dramatically reverse that company's marketing strategy. OTA also assumes that consumers will be content to pay for all these currently available fuel saving technologies--front wheel drive, four valve per cylinder engines, improved transmissions, etc., and not switch to larger alternative vehicles such as vans or keep their older, less-expensive cars.

Third, S. 1224 keeps the separate CAFE calculation for a manufacturer's domestic and foreign car fleets. If this bill were to become law, there will be even more incentive for U.S. full line manufacturers to increase the foreign content of their larger cars in order to average those cars with their imported foreign cars. Ford has already switched two full sized cars from its domestic fleet to its foreign fleet by increasing the foreign content--importing more foreign parts. Any sizeable increase in the 27.5 standard will increase the likelihood that Congress will continue exporting jobs in this way.

Finally, S.1224 continues the single-minded approach to improving miles per gallon of the old CAFE law irrespective of competing policies. Specifically, there is an environmental penalty for increasing fuel efficiency. The use of higher compression engines and leaner mixtures increases the formation of oxides of nitrogen. The catalytic converter was the "silver bullet" that allowed manufacturers to increase gasoline mileage and reduce emissions simultaneously. However, the limits of the catalytic converter are being reached. The very strict standards for emissions of oxides of nitrogen that are being considered in the environmental committees in Congress will make it extremely difficult to meet increased fuel economy by additional engine changes. In addition, the National Highway Traffic Safety Administration Reauthorization bill contains a number of new safety requirements that will increase vehicle weight--making it more difficult to meet existing and higher CAFE standards.

Much is being made of increasing CAFE standards in order to decrease carbon dioxide (CO2) formation. Reducing the number of gallons of gasoline consumed would only reduce CO2 buildup by a minuscule amount in global terms. Even if Congress could waive a magic wand and dictate that all new cars would be twice as fuel efficient as they now are, Ford Motor Company estimates such actions would result in a decrease in greenhouse gases by one-half of one percent after 15 to 20 years, the time it would take to replace the old fleet. Thus, U.S. consumers would be paying an enormous price tag for the privilege of riding in very small cars in a unilateral, token solution to a problem whose scope and actual danger has not yet even been determined.

Mr. Chairman, this is a good time not to create bad policy. Our economy is strong, we are not in the midst of a national security or energy crisis, and the President is a partner with the Congress in constructive environmental legislation, including aggressive study of the "global warming" issue. I hope the committee will carefully weigh the costs and technological limitations with respect to an increase in CAFE standards, and not rush to make this bad CAFE law worse.

Senator BRYAN. Thank you very much, Senator Nickles.

Senator Metzenbaum, good morning.

STATEMENT OF HON. HOWARD METZENBAUM, U.S. SENATOR FROM OHIO

Senator METZENBAUM. Thank you, Mr. Chairman. How much time do we have?

Senator BRYAN. Because we have an extensive list of witnesses this morning, Senator, we have tried to ask the witnesses to hold it to five minutes. There is always a little latitude there if you need it.

Senator METZENBAUM. I appreciate that.

I am sad to appear before you this morning as the owner of one of the most, probably the most, fuel efficient cars of any Member of the United States Senate. My car would not start this morning.

I am happy to have the opportunity to testify today, and I am so pleased that this subcommittee is moving forward in its effort to pass legislation to strengthen and improve CAFE standards. In my opinion, there is no more essential responsibility to meet several critical public policy goals, including decreasing our oil imports, reducing environmental harm and enhancing the international competitiveness of our domestic auto industry.

Now I come from a state that has a tremendous number of auto workers, and there is probably no Member of the United States Senate that gets more support from that group of people, those auto workers, in any segment of the country than do I. So there is nothing I would propose that would in any way impact upon the jobs of those workers, because my relationship with them is very close.

On May 12 I introduced S. 984, the Automobile Fuel Economy Act of 1989, with Senators Heinz, Wirth, Bumpers, Conrad, and Jeffords. It differs from S. 1224 in that it maintains a single CAFE standard for all auto makers rather than using the percentage improvement approach.

Both bills are very similar, however, and share the same goals. They reinstate the Federal Government's commitment to continued improvements in auto fuel economy, and they do so by adopting aggressive but achievable standards which can be met exclusively by technological measures.

Either bill would be a major improvement on the current legislation and deserves the prompt attention of the full Senate. That is the objective.

I might add, Mr. Chairman, I expect the Senate to respond favorably to CAFE legislation this year. In no other area of energy or environmental policy can we achieve so much gain with so little pain. CAFE legislation can easily save 400,000 to 600,000 barrels of oil daily by the mid-1990s and a proportionate reduction in carbon dioxide.

All of us are concerned about the environment. All of us feel a need to do something specific about it. This is something specific.

Furthermore, I am afraid that without CAFE the auto companies will be lulled by relatively low gasoline prices into building relatively inefficient gas guzzlers that will not be able to be internationally competitive. Frankly, one automobile manufacturer said that since it appears that Congress is moving in this direction they are already arranging to change their goals, their objectives and their technology.

Nothing threatens our domestic auto industry more than a shortsighted view toward energy prices. Let me suggest four considerations that I believe are essential to any CAFE legislation.

First, I strongly encourage you to pursue the most aggressive level that can be achieved by technological improvements. I say this not because of an undue faith that some unexpected breakthrough in the laboratory will save the day, but for just the opposite reason: because currently existing and familiar technologies can be employed to achieve a markedly increased fuel economy.

A technology-based CAFE standard means that oil companies would not need to alter the size or performance of the mix of cars they produce, nor would they have any incentive to move car production overseas. Rather, they could simply continue to increase the market penetration of fuel efficient automotive technologies in their existing models and at their existing production plants.

As you know, there are independent studies that demonstrate that a CAFE of 34 to 35 miles per gallon can be achieved simply by using available and familiar technologies.

Second, any legislation must remove the loophole that currently exists that permits auto makers to meet CAFE standards solely by sending certain production overseas rather than making real improvements in efficiency.

I think that is wrong. Frankly, I do not believe that auto companies make important decisions about outsourcing the production of autos based only upon CAFE, but I do want to give them every incentive to produce all their cars domestically and will work hard to ensure that legislation does just that.

My legislation meets this challenge with its "no backsliding" provision, which says that neither the domestic nor foreign subfleet of a manufacturer can backslide—that is, lose ground in fuel efficiency—even if it is above the CAFE standard. No backsliding thereby closes the loophole that domestic manufacturers such as Ford are now trying to exploit in CAFE's accounting rules and simultaneously discourages the Japanese manufacturers from having an undue advantage with respect to the midsize market.

A properly structured CAFE will prevent Ford from engaging in their threats to American workers. Frankly, I resent those threats that they have made to workers in my own state. There are other approaches. I suggest to Ford that we work together, not against each other. There are other approaches to addressing outsourcing, and I welcome that.

I expect that my friend, UAW President Owen Bieber, will help us address this concern, but let me state in the strongest way possible that CAFE legislation that does not address the related problem of outsourcing is not acceptable to this Senator nor, I believe, to the Congress as a whole.

Third, legislation should update the penalties associated with noncompliance with CAFE penalties, which have not increased since 1976 when EPCA was passed. My legislation would double the penalties and give the Secretary of Transportation additional flexibility to penalize companies that display an ongoing flagrant disregard for the law.

We in the Congress must make it impossible for companies such as Mercedes and Jaguar, who do not care about the extra dollars involved, to ignore the standards year after year after year by just adding a few thousand dollars to the price of their cars because their buyers do not care much about that.

Finally, I believe that for legislation to pass this year, it should be simple. It may make sense at some point in the future to consider other approaches to fuel economy standards, and my legislation authorizes several studies by Federal agencies regarding CAFE.

Our most immediate important challenge is to pass strong CAFE legislation now, to reinvigorate the policies of fuel efficiency, environmental safeguards and protection for domestic auto workers, and to give direction to the auto manufacturers so that they may know what the future holds. The simpler we can keep the legislation, the more likely we will be to pass and enjoy the active support of the American public.

Mr. Chairman and Members of this committee, I again thank you for allowing me to testify today. I commend your hard work and offer you my total support to pass strong CAFE legislation this year. Whether it is my bill or John Smith's or the Chairman's or anybody else in the whole world, I just want to get a bill passed.

Thank you, Mr. Chairman.

Senator BRYAN. Thank you very much, Senator Metzenbaum. We appreciate your testimony and look forward to working with you as well.

Our next witness is Mr. Owen Bieber. Mr. Bieber is the President of the United Auto Workers, and we welcome him this morning to this committee hearing.

Mr. Bieber.

STATEMENT OF OWEN BIEBER, PRESIDENT, UNITED AUTO WORKERS, ACCOMPANIED BY CANDACE HOWES, ECONOMIST; AND RICHARD WARDEN, LEGISLATIVE DIRECTOR

Mr. BIEBER. Thank you, Mr. Chairman. I have with me this morning Candace Howes, who is an economist in our research department, and Richard Warden, who is our legislative director.

Mr. Chairman, I am Owen Bieber, President of the UAW.

Senator BRYAN. Mr. Bieber, could we get you to move that microphone just a little closer.

Mr. BIEBER. You are the first person who ever asked me to move a microphone closer. Most times they ask me to push it back.

Senator BRYAN. Unusual things occur here in the Congress, as you know.

Mr. BIEBER. I am pleased to be here this morning to share with you our views on the issue of motor vehicle fuel economy and on your bill S. 1224. We believe your bill represents an important and constructive contribution to the debate on the fuel economy issue, and we endorse several of its provisions.

In its present form, however, we cannot support S. 1224 in its entirety, and we welcome this opportunity to explain why.

With your permission, Mr. Chairman, I will file my prepared statement for the hearing record and merely summarize it at this time.

Senator BRYAN. Your statement will be included in the record.

Mr. BIEBER. Thank you.

As a trade union, the UAW is first and foremost concerned about our members' jobs, but a healthy environment and energy conservation are also workers' concerns.

In 1975 when the legislation that became the Environmental Policy and Conservation Act was being debated in Congress, the UAW supported an approach to standards which would require the fuel economy of each company be averaged across separate domestic and foreign fleets.

We believe that standards based on fleet-wide averages had several advantages. First, the law would act as an incentive for the companies to make progress towards improved fuel efficiency. Second, we thought the fleet-wide average approach would allow the companies the flexibility to provide a full range of vehicles and, finally, because we were concerned that domestic manufacturers, comparatively inexperienced in small car production, would try to meet the fuel economy standards by importing small cars, we hoped the separate fleet averaging requirement would help promote American jobs in small car production.

As you know, the law, as enacted, required companies to achieve separate domestic and import fleet-wide fuel economy averages of 27½ miles per gallon by 1985.

Now, almost 15 years later, the law is being reconsidered; we believe this is necessary for several reasons. First, the energy conservation needs of the country are critical to solving the problems of finite fossil fuel reserves and growing dependence on foreign oil. We also now face the problem of global warming.

Second, while separate domestic and foreign fleet averaging was included in the law to encourage domestic production of small fuel-efficient cars, the companies have continued to out-source them. This practice, in part, explains the failure of Ford and General Motors to achieve the 27½ mile per gallon standard since 1985.

To offset the effect of small car out-sourcing and fuel economy, Ford has recently announced its intention to source enough components for its large cars from abroad to reduce their domestic content below 75 percent. The law provides that cars with more than 75 percent domestic content are considered domestic. Those with less than 75 percent are considered imports.

By its action Ford could shift its large cars out of its domestic fleet and raise that fleet's fuel economy average above the present standard.

We believe the current statute in practice can create an incentive for the companies to out-source in order to meet fuel economy standards. And such accounting practices provide no—I underscore—no energy conservation benefits to society, but they can cost us many good U.S. manufacturing jobs. This is a problem the statute could and should address.

Third, the companies have argued that the structure of the current law creates competitive inequities between companies with different mixes of vehicles. These same companies argue that the fuel economy law prevents them from competing in new market niches where companies which have specialized in smaller cars are free to move.

Whether or not the law has inhibited the full-line producers from moving into new market niches, it is a potential inequity which would be eliminated.

Given these problems with the current statute, the UAW would like to see a revised fuel economy law, one which guarantees real improvements in fuel efficiency by all companies, which does not create incentives to source large cars abroad, which provides incentives to build small cars in the U.S. and which does not put full-line producers at a competitive disadvantage in today's changed market.

Your bill, Mr. Chairman, addresses some of the problems in the existing statute. First, since compliance would be measured by a percentage improvement in fuel economy average, all companies would be required to improve their fuel economy regardless of their current status.

Second, because the companies would have to achieve percentage improvement in both domestic and foreign fleets, it would be difficult for them to raise their domestic fleet average by out-sourcing large cars.

And, third, since all firms have to achieve improvements in fuel economy, it would be difficult for any company to move into more high-performance vehicles, and that should reduce any CAFE-related competitive disadvantage that may exist for full-line producers.

But one issue of concern to the UAW which your bill fails to address directly is the out-sourcing of small cars. Small car out-sourcing is more than just a jobs issue, as I have explained in my prepared statement. It also threatens our automotive base in the long run.

We suggest that your bill could be improved by providing a CAFE incentive for fuel-efficient car production in the United States. A CAFE credit for domestic fuel-efficient vehicles would provide an incentive to bring small car production back to underutilized U.S. factories.

And, finally, there is one area which we believe demands rethinking. That is the magnitude of improvements in fuel efficiency which the bill requires.

We do not believe that a 20 percent improvement by 1995 is possible, and we see no clear evidence that a 40 percent improvement by the year 2000 is feasible. Given the long lead time required for product planning, it would be too costly and perhaps technologically impossible at this late date to radically affect the companies' product offerings for the year 1995.

In our judgment, the legislation should focus on standards for the year 2000 by which time companies can reasonably be expected to adjust their product plans and to introduce new technology.

It should provide environmental benefits to society without jeopardizing the jobs of our members, without disrupting communities or causing unnecessary dislocation in the domestic automobile industry, an industry which is most vital to our nation's economic health.

At the same time we think it is important to retain the administrative discretion, to relax or strengthen standards which is now in the law.

It is impossible to anticipate all the events through the year 2000 which may prevent manufacturers which are acting in good faith from complying with the law.

Mr. Chairman, let me once again thank you for giving us this opportunity to address the important issue of motor vehicle fuel economy.

We look forward to working with you and working with your subcommittee as you move forward on this issue. Thank you very much.

[The statement follows:]

STATEMENT OF
OWEN BIEBER, PRESIDENT
INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA (UAW)
ON
S. 1224, THE MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989
BEFORE THE
CONSUMER SUBCOMMITTEE OF THE
SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION

September 7, 1989

Mr. Chairman, my name is Owen Bieber. I am President of the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW). Our Union represents approximately 1.4 million active and retired workers. I am pleased to have this opportunity to share with you our views on the issue of motor vehicle fuel economy in general and on your bill, S. 1224, in particular. We want to thank you, Mr. Chairman, for making this time available to us.

Since the mid 1970s when efforts to increase fuel economy first became a national priority, the UAW has supported the principle of mandatory fuel economy standards for motor vehicles to achieve the goals of energy conservation and reduced dependence on imported oil. We are a trade union concerned about our members' jobs, but a clean environment and energy conservation are also workers' concerns. Just as policies to create jobs must be sensitive to environmental goals, so must energy and environmental policies recognize the need for employment security and the protection of communities. In the past, we have supported policies which achieved environmental goals without undue dislocation. We are here today because we want to help you design fuel economy legislation which will provide environmental benefits to society without jeopardizing the jobs of our members, disrupting communities or causing unnecessary dislocation in the domestic automotive industry -- an industry which is vital to our nation's economic health.

In 1975, when the bills that eventually became the Environmental Policy and Conservation Act of 1975 (EPCA) were being debated in Congress, then-UAW President

Leonard Woodcock testified before the Senate Commerce and Finance Committees. At the time, the UAW advocated the enactment of fuel economy standards for passenger vehicles, to be phased in over the 10-year period between 1975 and 1985. Congress was considering several approaches by which to measure compliance. The UAW supported an approach requiring the fuel economy of each company to be averaged across the entire fleet and to be at or above a minimum standard.

A fleetwide average would allow companies to build an adequate range of vehicles to satisfy consumer tastes. As long as vehicles in most size classes were making steady progress toward improved fuel economy, the requirements of energy conservation would be met. At the same time, manufacturers would have the flexibility to focus technological improvements and redesign efforts on a limited range of vehicles at any given time in each design cycle rather than instituting sweeping changes across the entire fleet. The fleet average approach would thus be less costly for American consumers who would initially have to absorb the cost of new technology in higher vehicle prices (a cost which would be recouped over time in lower fuel costs per mile). Finally, we believed that fleetwide averaging offered an incentive to manufacturers to focus production, engineering and sales efforts on small vehicles which could be used to offset the lower fuel economy of the more profitable large cars. Domestic manufacturers which put more effort into design and development of smaller vehicles would be able to offer a product competitive with the new manufacturers entering the low end of the market. It was our hope that compliance based on fleetwide averaging would slow the loss of jobs in small car production and provide an incentive to shift the sales mix toward more fuel efficient vehicles.

During the same round of hearings, the UAW also advocated that a federal agency be established to coordinate research on fuel economy and emissions technology, that a comprehensive transportation policy be developed to promote other approaches to fuel conservation, and that dislocation programs be developed for workers impacted adversely by fuel economy-related actions.

Later on in the process, we endorsed a provision requiring separate domestic and import fleet averaging. We were concerned that domestic manufacturers, comparatively inexperienced in small car production, would try to meet the fuel economy standards by importing small cars. Since U.S. firms would need domestic small cars to offset the low fuel economy of large vehicles, we hoped the separate fleet averaging would discourage sourcing of small cars abroad and encourage production of such cars in this country.

The Environmental Policy and Conservation Act, which was approved by Congress in December of 1975, required companies to achieve separate domestic and import fleetwide fuel economy averages of 27.5 mpg by 1985. For U.S. companies, 27.5 mpg represented an ambitious 85 percent improvement in their domestic fleet fuel economy over 1975.

PROBLEMS WITH EPCA

By late 1982, the average fuel economy for the domestic new car fleet had risen 69 percent to 25 mpg, and by 1988 it had risen another 8 percent to 27.1 mpg. The companies have argued that when the average fuel economy of all new cars sold in the United States, including imports and domestics, surpassed 27.5 mpg by 1985, the goal of EPCA had been achieved. We disagree with the companies. We would like to see the national resolve to reduce fuel consumption reiterated. We also believe the statute, in its present form, has many shortcomings which should be addressed when the Act is revised.

First, the energy conservation needs of the country are more critical now than they were in 1975. We know more now than we did about the implications for the environment of burning fossil fuels. Climatologists have concluded that the gasses emitted when fossil fuels are burned accumulate in the stratosphere creating a greenhouse effect which causes a long-term, gradual warming trend. There is no consensus about when that warming trend will begin to manifest itself, but there is little disagreement that it will occur. To the problems of finite fossil fuel reserves and growing dependence on foreign oil, we now add the problem of global warming as an imperative for fuel conservation. Scientists tell us that because carbon dioxide, the main greenhouse gas, cannot be practically reduced with emissions control technology, the only viable solution to global warming is to burn less fossil fuel. Consequently, we cannot be satisfied with our achievements in motor vehicle fuel economy to date.

Over the ten years that EPCA has been law, we have also had the opportunity to observe problems which were not anticipated when the statute was first written. As I mentioned earlier, separate fleet averaging was included as a provision to encourage domestic production of small cars. But the companies have continued to outsource small cars throughout the 10-year period. General Motors discontinued production of its subcompact Chevette in 1987 and has filled out its product line with the minicompact Sprint (now the Geo Metro) and the subcompact Spectrum, both built in Japan, and the Pontiac LeMans, built in Korea. Ford will move one-third of its subcompact Escort production to Mexico in September and has for two years been importing the Festiva from Korea and the Tracer from Mexico. Chrysler plans to discontinue the Omni/Horizon next year. The company has been importing the Colt from Japan for many years. We believe the failure of Ford and General Motors to achieve the 27.5 mpg standard since 1985 can in part be explained by the decision to outsource small cars.

To offset the effect of small car outsourcing on fuel economy, the Ford Motor Company has turned separate fleet averaging on its head. Ford recently announced its intent to source from abroad a sufficient number of components for its Crown Victoria and Grand Marquis to reduce their domestic content below 75 percent. Under EPCA, vehicles with at least 75 percent domestic content are treated as "domestic";

those with less than 75 percent domestic content are "imports." By such an action, Ford would be able to shift large cars out of its domestic fleet and raise its fleet average fuel economy above the standard. Because foreign-squrced, fuel efficient vehicles such as the Festiva and the Tracer are included in the import fleet, the Crown Victoria and Grand Marquis would not pull the fuel economy average of the import fleet below 27.5 mpg. As long as the average remains above 27.5 mpg, there is no penalty under the current law for reducing fuel economy in the import fleet. The total fuel economy for Ford's combined import and domestic fleet would not increase and so there would be no energy conservation benefit to society. But U.S. jobs will be lost as parts or whole vehicles are sourced abroad.

The companies have argued that the structure of the current law also creates some competitive inequities between companies. We had hoped that fleetwide averaging would discourage companies from moving their vehicle mix upscale. It was expected that companies would be able to achieve large improvements in fuel economy only through a combination of new technologies and a shift away from large cars. However, according to the companies, a fleetwide average with a single standard has created inequities between companies with different mixes of vehicles. As the economy recovered unevenly and Reagan era tax laws redistributed income upward, and as the real price of gasoline declined, there has been a growing demand for high performance vehicles. Companies which have produced a full line of vehicles with average fuel economy at or below the standard, risk further depressing their fleetwide fuel economy average if they introduce new high performance vehicles. These same companies argue that the fuel economy law prevents them from competing in new market niches where companies which have specialized in smaller cars are free to move. It is our impression that the "full-line producers" have chosen to move into new market niches regardless of the fuel economy implications, knowing that under the past Administration, they could probably count on the standard being relaxed to accommodate them.

The UAW would like to see a revised fuel economy law which guarantees real improvements in fuel efficiency by all companies, which does not create incentives to source large cars abroad, which provides incentives to build small cars in the U.S. and does not put full-line producers in a position to argue that the law places them at a competitive disadvantage in today's changed market.

THE BRYAN BILL

Your bill, Mr. Chairman, which would require percentage improvements in fuel economy for each company and for each fleet, domestic and import, addresses some of the problems in the existing statute.

First, since compliance is measured by a percentage improvement in fuel economy averages, all companies would be forced to improve their fuel economy regardless of their current status. Companies which have been able to exceed the standard based on vehicle mix alone, would now be forced to adopt widely used technologies. Moreover, a statute modified as you have suggested would put all companies in jeopardy of falling short of the standard if they move into high performance niches. It is our hope that if all firms face a common risk in moving upscale that all will be reluctant to do so. At the very least, it will be more difficult for the Department of Transportation to accept the argument that the standard should be relaxed because it puts some firms at a competitive disadvantage. In contrast to the current statute, we are more likely to see fleetwide improvements in fuel economy since all companies would be discouraged from moving into higher performance vehicles.

Second, in contrast to the current statute, the percentage improvement requirements would make it difficult to raise the fuel economy average of the domestic fleet by shifting low fuel economy vehicles into the import fleet, since the company would be required to achieve improvements in both fleets.

Finally, because the principle of fleetwide averaging is preserved, the companies would still have the flexibility to develop new technologies for a limited range of vehicles at any one time.

For these reasons, Mr. Chairman, we believe that your bill, which would require separate import and domestic fleetwide average percentage increases in fuel economy, would be a great improvement over the existing statute.

But one issue of primary UAW concern which your bill fails to address directly is the continual outsourcing of small cars. While our main concern is the thousands of jobs this trend has cost us over the last ten years, small car outsourcing is more than a jobs issue. It also threatens our automotive base in the long run. There are important synergies in the design and manufacture of subcompact and compact vehicles. Small vehicles often have components or design attributes in common. Therefore, there are bound to be economies of scale in the combined design and production of subcompact and compact vehicles.

U.S. firms have progressively outsourced subcompact cars over the last ten years. As a consequence, they are also weakening their position in the compact market where much of the foreign competition is now focused. U.S. firms have taken a shortsighted approach to the challenge of foreign competition in the subcompact market, and we fear that they will take a similar shortsighted approach in the compact market. If the compact market goes as the subcompact market has gone, before too long there will be no U.S. designed and built subcompact or compact vehicles. If the trend toward fuel conservation and self-reliance continues as it should, small cars may again be the vehicle of choice for many consumers who will be forced to purchase foreign vehicles. Therefore, we think that it is important to give the U.S. manufacturers a direct incentive to build small cars in the U.S. Otherwise, their short term planning horizon may leave them with no products for a segment of the market which is likely to grow over time.

We suggest that your bill could be improved by providing a CAFE incentive for domestic small car production. Similar to the Alternative Motor Fuels Act passed in 1988 which granted extra CAFE credit for flexible fuel vehicles, this provision would grant extra CAFE credit for small cars built in the U.S. A small car CAFE credit would provide an incentive to bring back to underutilized U.S. factories small car production which has been outsourced. Further, a direct incentive to the companies to shift their vehicle mix toward small cars could lead to further increases in overall fuel efficiency.

We believe that to some extent consumer taste for high performance vehicles is being fueled by a competitive drive on the part of manufacturers to provide ever more profitable products in the market. The combination of a percentage based fuel economy law which imposes penalties on all producers which fail to meet the standard when they move upscale, and a direct incentive to produce small cars in the U.S., should compel motor vehicle manufacturers to offer a more fuel efficient fleet.

Finally, as strong as this bill is we think there is one area which demands rethinking. Your bill would require a 20 percent improvement in fuel efficiency over 1988 actual levels for all manufacturers, and a 40 percent improvement by 2000. Based upon a review of the work that has been done by the Office of Technology Assessment (OTA) and the Department of Energy, we see no evidence that a 20 percent improvement by 1995 is feasible, and no clear evidence that a 40 percent improvement by 2000 is feasible. Given the long leadtime required for product planning, evidence suggests that the companies' plans for 1995 are already firmly locked in and that it would be unnecessarily costly and perhaps technologically impossible to radically affect their product offerings through fuel economy legislation at this late date. We do, however, believe that the companies have plans for some improvements in fuel economy by 1995, and that the best strategy for your legislation is to try to lock those plans in with standards somewhat above the current fuel economy average of each company. . The companies would then be constrained from offering higher performance vehicles than are already planned.

In our judgment, the legislation should focus on standards for the year 2000, by which time companies can reasonably be expected to adjust their product plans and introduce new technology. Studies suggest that there is enough proven technology which could be implemented by 2000 to significantly improve fuel economy. Of course, one cannot foresee all possible events which might alter the projections for feasible fuel economy levels by 2000. Consequently, it is important to retain the Administrative discretion now in the law to relax standards if unforeseen events prevent those manufacturers which are acting in good faith from complying with the law. I think you are more likely to get the support that this legislation deserves if you concentrate on standards for the year 2000 and allow for Administrative discretion.

In conclusion, there are many aspects of the proposed bill that the UAW supports. We believe a statute which requires each company by the year 2000 to separately improve the fuel economy of its domestic and import fleets has a very good chance of reducing fuel consumption without causing dislocation and hardship for the workers or their employers. We think the intent of the bill to increase fuel efficiency without causing intolerable dislocation would be further enhanced by a provision which provided extra fuel economy credit for domestic small car production. Finally, we urge you to modify your bill to recognize that achievement of significant fuel economy improvements by 1995 is not feasible, given the long leadtime which companies require for product development.

We continue to urge policymakers and legislators to consider the need for federal coordination of fuel economy-related R and D, a comprehensive transportation policy and dislocation programs for workers adversely impacted by new regulations.

Mr. Chairman, let me once again thank you for giving us this opportunity to address the important issue of motor vehicle fuel economy. We look forward to working with you and your Subcommittee as you move forward on this issue.

Senator **Bryan**. Mr. Bieber, thank you very much. I would like acknowledge on behalf of the subcommittee our appreciation for the leadership which you have shown on this issue and the support of the United Auto Workers dating back to 1974.

I think that your confidence in the approach of this type of legislation in terms of its efficacy has been more than justified. As you know, within a decade we have virtually doubled the fuel efficiency standards of American automobile production, and I think with a continued effort, we can build upon that.

You have raised a couple of concerns. I would like to ask a couple of questions about these matters. You are concerned about the lead time.

As you know, the approach that we have taken is bifurcated, creating separate standards for 1995 and 2001. Your concern, as I understand your testimony, is essentially that, because the product mix is somewhat cast rigidly, the 1995 standard may not give the industry enough time.

Now, I know your preference is not to have anything go into effect until the year 2001, as I understood from your testimony. What kind of lead time, Mr. Bieber, would be necessary to give the automobile industry time to make the kinds of adjustments that would be necessary to enhance fuel efficiency?

Mr. **Bieber**. Well, I must say to you, in all honesty, I do not think 10 years is out of the question. The reason I said I think that the models for 1995 are pretty much cast in cement, so to speak, is that historically, on items of even less magnitude than trying to build in conservation and fuel this has been the case. If you take a look at just design of cars without considering what it does on fuel efficiency, you have generally used a five-year running time.

I may be the only person, at least in the United States and possibly in the world, who gets an opportunity, committed to confidentiality, to see the proposed fleet for each auto company well in advance. And I can tell you, having that knowledge, that I feel very confident in saying to you that to look to do anything substantially between now and 1995 I think is impossible.

On the other hand, I would point this out. I expect that the companies would produce some additional efficiency during that period because, if there is the breakthrough, if it comes—and sometimes it does in a shorter period of time from a competitive standpoint and a marketplace advantage—it would be ridiculous for them not to come forth with those kinds of fuel efficiencies as soon as they could because it enhances their product, and they appeal to the public.

But to try, by legislation, to mandate something between now and 1995, I think is impossible, although I would expect there will be some additional efficiencies.

Senator **Bryan**. Both Senator Metzenbaum and yourself mentioned the out-sourcing concerns that you have in terms of encouraging domestic small car production, and you have in your testimony recommended a CAFE credit for increased domestic small car construction. Is that CAFE credit a corporate solution or a partial solution to the out-sourcing problem? I understand the out-sourcing problem not to be just with respect to small car domestic production, but an industry-wide problem.

If the CAFE credit is not the out-sourcing solution that you would ask this subcommittee to consider, could you share with us what you believe ought to be included in the legislation insofar as it addresses your out-sourcing concerns?

Mr. BIEBER. Well, first of all we propose to put a credit on bringing small car production back into domestic plants. I would point out to you, Mr. Chairman, and for the committee that when the present statute was enacted in the mid-1970s, I am not going so far afield from what the intent was in that statute.

First of all, bringing those cars back into our fleet would help raise the fleet average. In addition to that, when you abandon a total section of the market, which unfortunately our domestic producers have done in the small car, there is nothing that says the next target will not be the subcompact. Then when you move through that phase, you get to the compact. I think smaller cars are an important part of our overall industry. It is important to our industry and the viability of that industry, and it helps increase the fuel efficiency.

I would urge that we would put an additional credit on that to help motivate the manufacturers to bring those cars back into the domestic fleet.

Now, the other side of the coin is we certainly have to close that loophole in the legislation which now allows the manufacturers to move to downgrade the domestic content of the big car, to flop it over into an import fleet.

It does nothing—nothing at all—to help in the overall situation, and it is a disincentive. Look what Ford said. When there is talk about new legislation, well, then, we will make the move now to see to it that we drop the Crown Victoria and some others into the import fleet.

Well, I would suggest that that in no way helps the situation that we are talking about here today. It does not help the consumer, it does not help the environment, it does not help anything else.

Senator BRYAN. And as I understand it, this is simply accomplished by increasing or rather reducing the domestic content of the automobile. Therefore, the vehicle qualifies as a foreign import. It can go into the foreign fleet product mix which may be lower to begin with, and so there is no incentive to improve the efficiency of that particular automobile. Am I correct?

Mr. BIEBER. That is correct. All you have to do is drop the domestic content below 75 percent and it falls into the import fleet.

Senator BRYAN. Mr. Bieber, I thank you.

Senator Gorton.

Senator GORTON. Mr. Bieber, you made the suggestion both in your written testimony and in response to a question from the Chairman about an extra CAFE credit for smaller cars built in the United States. Would not such a credit violate our obligations under the General Agreement for Tariffs and Trade?

Mr. BIEBER. I do not think so, Senator, because it would only apply to those cars—it would apply to all of them, any car built in North America.

Senator GORTON. But not to any car built outside North America by no matter who?

Mr. BIEBER. Any car built in the United States by either U.S. companies or foreign companies.

Senator GORTON. But you do not think that credit would violate GATT?

Mr. BIEBER. No, sir, we do not believe it would.

Senator GORTON. You may have answered this also in connection with a question by the Chairman when you said that a 20 percent CAFE increase by 1995 is unrealistic.

Do you mean that no increase by 1995 is appropriate or would there be some number below 20 percent which we might appropriately include in the legislation in your view?

Mr. BIEBER. Well, Senator, in answer to the Chairman's question along that same line, what I said was I do not think it makes sense to try to set a figure by 1995.

Senator GORTON. So, we should not set any figure?

Mr. BIEBER. No, no, no, let me follow up on that. I believe that you will see additional CAFE increases because when you take a look at—well, let me give you an example.

The quad IV engine is a good example. Well, if you are using that quad IV engine in, let us say, only 10 or 20 percent of your fleet and you increase the use of that quad IV into 50 or 60 or 70 percent of the fleet, there is a built-in savings there, increase in the economy.

I think you are going to see that. You see the other companies talking about the four-valve engine, and all of that leads to more conservation.

The other point that I made was that it would be foolhardy for a company, if they had the means of providing additional economy, more miles per gallon, not to do that. It gives them a competitive edge out there in the market, a market which I might say, Senator, is very tough right now.

But, I go back to my point of saying I do not think that you can realistically look at 10 percent or anything else before 1995 and say that you can drive them to that unless you are willing to accept a lot of other disadvantages in doing that.

Senator GORTON. Thank you. Thank you, Mr. Chairman.

Senator BRYAN. Senator Gore.

Senator GORE. Thank you very much, Mr. Chairman.

Mr. Bieber, welcome. I appreciate your friendship and, as others have noted, your leadership in a variety of different areas. And I am happy to have a dialogue with you in the brief time that I have on this panel.

This is a very complex subject, and I know the UAW has wrestled with it as all of us have wrestled with it. Let me just try to get a clear picture of where we are and where you think we ought to go.

The current CAFE approach, the one that is in present law and the approach that would be extended by the Metzenbaum bill and some other proposals is not really your favorite, is that right? You do not really like the way it is now, and you would not really like to see an extension of the current approach to it. You would like to see it changed. Is that fair to say?

Mr. BIEBER. Well, let me answer it this way, a little bit diplomatically if I can. You heard the Senator refer to me as his good friend, and I consider you my good friend, and I see a lot of other good friends here, and I want to continue to be good friends with everyone, so I am not going to tell friends here that I am for this or for that. But I think you can see from my testimony that there are areas in which we differ, and I do not know how to explain it any different than I have already.

Senator GORE. All right. Now, I fully appreciate that because you and I are good friends, too, and occasionally I want you to give the same kind of response to one of my ideas. But, basically, there has been a kind of a learning experience that has convinced many people that the present approach has some deficiencies and should be modified. Okay.

Now, there are some other ideas that are floating out there. One of them is embodied in the bill that is presently before us. It was embodied in the legislation that I introduced on the first day of the Congress. Let me ask you a couple of questions about that.

Of course, it has some appeal partly because it takes away the advantage that foreign-based manufacturers have under the current scheme and sort of puts the shoe on the other foot in a sense because it would, would it not, kind of pinch more on the manufacturers overseas than the manufacturers here?

Now, you can give a diplomatic response to that, too, if you want, I see.

Mr. BIEBER. Well, I do not really think it does. I do not see it having that kind of a pronounced disadvantage. It treats all of the companies equally, and what it provides for is that no one can make a gigantic move upscale. And if you continue to move upcale, everybody goes that route. The more emphasis we get there, the more that mileage per gallon drops.

Senator GORE. I understand, but basically it applies equally to everyone. I understand that. But if you take into account the real situation which is that they have gone farther on efficiency improvements and, therefore, the easy gains, the easier gains are not as readily available to them because they have already taken them, and then a percentage by a manufacturer approach would make it harder for somebody that has already taken that step than for somebody who has yet to take the easier gains.

I think that is fair. It may be a little convoluted the way I have expressed it, but I think that is pretty generally the impression people have about the approach that I have recommended and the chairman has recommended. And I am just sort of acknowledging that there is that effect. And let me tell you one reason I am concerned about it.

If we enact restrictions that the longer-term effect of forcing only foreign manufacturers to make the next generation of efficiency improvements, might we face the situation a few years from now where our manufacturers have taken the easier route and made the gains that the foreign manufacturers have already made and because they are under the extra pressure, they make the big leap to new advances and all of a sudden they come to our shores with dramatically more efficient vehicles, the next generation of technology, and we are right back in the soup with American manufacturers at a disadvantage.

Mr. BIEBER. Well, let me answer your question this way. The kind of improvement we are talking about—we do not think it would be impossible, and we do not think your approach and the bill's approach makes it impossible for anyone to go that route and not to be put at a disadvantage.

As a matter of fact, I might point out that part of why we are recommending moderation, as I have suggested in the percentage improvements mandated is for that very purpose, that I do not want to see anyone pushed to the extent that it is an impossibility. I do not think that anyone here wants to do that.

Senator GORE. Well, again, I do not want to argue against the approach recommended by the subcommittee. I have been identified with that same approach. But, you know, when we passed the first bill, you have gone through the same experience that we have in recognizing that there were some unanticipated problems there. And so I think, really, we have to have real open minds and look at some new ideas here and cast the net a little more widely.

Mr. BIEBER. But, Senator, if I might, I am sure that some of my friends on the other side of the argument are having a few thoughts. I do not think my testimony here this morning indicates one of the UAW's stand being, you know, straight ahead. Do not worry about any of the consequences.

And if you look at my testimony this morning, as opposed to the UAW's testimony in 1975, I think you see that reflection.

Senator GORE. Absolutely.

Mr. BIEBER. And I would also point out, I think you are right in saying some people may come to that conclusion. But, Senator, I think we also have to accept the responsibility and the fact that no matter what piece of legislation you pass is not going to be accepted by everyone and somebody is going to suggest there are inequities. I think the approach of the bill in regard to the items that you are talking about now is a fair and reasonable one and one that is attainable and does not put an unnecessary burden on anyone.

Senator GORE. If I could just indulge the—if I could be indulged for just one more minute briefly, I mentioned that I wanted to float some new approaches, and I would like to briefly get your reaction, and I am going to ask other members of the panel, I mean the other witnesses today. There is a third approach and a fourth approach and perhaps they could be combined, a size class, efficiency approach I am sure you are familiar with—your folks have analyzed it—which would require efficiency gains on each class of automobiles.

And then, another approach, and that is to have a revenue-neutral fee on emissions that would then be rebated as credits for the purchase of fuel-efficient cars. A CO_2—not only the pollutants that have been traditionally measured, but also CO_2 to get directly at the greenhouse problem, put a fee on them and have it revenue-neutral through a rebate system that encourages the purchase of more efficient automobiles.

Now, I have gone over my time, but I intend to pursue those ideas, and I would like to get your brief reaction to them.

Mr. BIEBER. Well, first of all, I think the size class presents a problem of flexibility for the companies. We have looked at the points that you have raised, Senator, and my testimony here today reflects what we think is the better route to go. I am not suggesting that we are not willing to talk to you or to any other Member of the committee on any one of these issues, but at the present time what I have said here this morning we believe is the better way to go.

Senator **Gore**. Thank you very much. Thank you, Mr. Chairman.

Senator **Bryan**. Senator Kasten.

Senator **Kasten**. Mr. Chairman, thank you.

I am having trouble understanding exactly what your position is. Let me just try to go back.

Do you favor percentage increases, or do you favor specific mileage targets, efficiency targets?

Mr. **Bieber**. Our position has been to favor percentage.

Senator **Kasten**. To favor percentages and not targets?

Mr. **Bieber**. Right.

Senator **Kasten**. Do you believe that a lesser percentage than 20 percent by 1995 or 40 percent by 2001 is achievable? Are you in favor of that, or are you basically in favor of the status quo. Would you prefer to have no legislation, whether it is this, the Metzenbaum legislation, or anything else that is out there?

Mr. **Bieber**. No.

Senator **Kasten**. If that is the case, what percentage reduction are you in favor of between now and 1995, and between now and 2001?

Mr. **Bieber**. Well, Senator, I will repeat what I said earlier. Between now and 1995, I think it is impossible to pick a figure out of the air and say it ought to be X percent or Y percent.

Senator **Kasten**. Should it be zero?

Mr. **Bieber**. I do not think it is going to be zero because I think there will be percentage increases that will flow. The market will have something to do with it.

As I said before, if you, as one example, spread the Quad 4 engine over a larger percentage of that fleet, which I think is going to happen, then obviously you raise fuel efficiency.

What I am trying to say is that I think it is impossible to legislate a figure now that will have any real meaning or effect upon raising that mileage between now and 1995. It is pretty much cast. I do not want to see more outsourcing to take more big cars out of the domestic fleet and raise fuel efficiency in that manner.

Senator **Kasten**. So what you are saying is that the mileage efficiency is going to increase, but your advice to us would be do not pass legislation that says how much it should increase between now and 1995.

Now let us go out to the year 2001. What percentage reduction do you favor for the target 2001?

Mr. **Bieber**. We do not have an exact figure. We do not have a figure to present here this morning.

Senator **Kasten**. Is 40 too high or too low?

Mr. **Bieber**. 40 percent, I think, is unattainable, and I am not just saying that. I think there are many other people, many other studies that I have looked at that buttress that argument. 40 percent is too high.

Senator **Kasten**. By 2001?

Mr. **Bieber**. By 2001.

Senator **Kasten**. Is 20 the target that the bill sets for 1995? If we took that target for 2001, would that be reasonable?

Mr. **Bieber**. I am really not in a position to suggest a figure here this morning. Obviously the answer to that question is that the figure that you propose for 1995 would be much more realistic by the year 2001.

Now having said that, I do not want somebody to say Bieber came here and said it is X percent by 2001, because if I wanted to get into that then I would pick a very low figure and we would start negotiating from that point forward.

Senator **Kasten**. But knowledgeable people including a number of the people here have introduced this legislation, and obviously they believe that 20 percent by 1995 and 40 percent by 2001 is workable.

Now I do not know if it is or not, but you are saying that the 20 percent by 2001 is, I understand you are not going to be——

Mr. **Bieber**. Senator, my testimony is not going to change. I can only keep repeating it. What I said was by 1995 I think it is useless to try to talk in terms of doing much about that. Focus on the year 2000 and 2001.

I do not know what figure to say to you this morning and, with all due respect, to the authors of this bill. I am sure that they find their way there very honestly. I have also looked and our people have looked at the information available, and I do not think that the 40 percent is attainable by that year. I do not know what that figure should be.

By the same token, I am not here suggesting the status quo. I am not here suggesting abolishing the law, and I do not think that my remarks indicated that.

Senator **Kasten**. Let me just switch to a slightly different part of this. If we do stick with a percentage, whether it is 20 or 40, it is easier to get the first 10 percent, as the Senator from Tennessee was pointing out, than it is to get that last 10 percent in terms of how much it costs.

Do you think it is fair to penalize those people, whether they are foreign or domestic, who have already made the change to more fuel efficient technologies. The next 5 or 10 or 40 percent is going to be relatively more difficult for them. Do you think it is fair to have a system that in effect penalizes the people that have made the progress voluntarily and have improved their efficiency on their own or because they think the market will demand it and they can sell more cars if they are more efficient?

Mr. **Bieber**. Well, part of the efficiency is the mix, and that is what I am advocating to help us. Bringing small cars back into this country would help. I do not look at this as being a penalty on someone. I think it is fair, and it is what we are trying to accomplish. I think that if the aim of everyone is increased fuel economy, then I do not see this as being unfair or a disadvantage to say that everyone raises accordingly.

Now if you take the other argument, the domestic producers could certainly argue that they have had a great deal of burden getting to where they are.

Senator **Kasten**. This is my final question. Would it then be more fair to somehow relate these standards to vehicle size, which would deal with your problem of the mix as opposed to percentages within the companies? If we were going to try to be fair, would it not be more fair to relate them to vehicle size than it would be to relate them to over all?

Mr. **Bieber**. No, we do not think so.

Senator **Kasten**. Mr. Chairman, thank you.

Senator **Bryan**. Thank you very much, Senator Kasten.

Senator Kerry.

Senator **Kerry**. Thank you very much, Mr. Chairman. I am delighted to be here with my good friend, and I, too, want to remain good friends.

Mr. **Bieber**. So do I, Senator.

Senator **Kerry**. Mr. Bieber, let me just ask you one or two very quick questions. Unfortunately, I am under pressure with respect to another committee, and I cannot stay for a full round; but I would like to submit some questions in writing afterwards.

What would you say is the state of the R&D for fuel efficiency going on in this area now and the state of technology? Is that sufficient at this point in time? Is there enough going on in terms of research?

Mr. **Bieber**. Frankly, I am not in the best position to answer that. I would not want to sit here this morning and say that I think that in every instance since 1975, everybody has done everything they could or should have.

Neither am I one who joins in the argument that you cannot do anything. I want to make that point. I think that too often that image has been projected.

I think the auto companies do understand that something is going to be done in this area, and so I do believe that they are giving emphasis to R&D. Again, I would point out that the market demands that they do this because if you can increase that fuel efficiency, it gives you a real selling point out there in what is a really, tough market right now.

You know, you see figures showing that a lot of cars moved, but the incentives put on to move those cars have been tremendous. I am a little bit concerned what happens when the last of the 1989 models move out and the 1990 model moves in there. I think we are going to have some real problems.

Senator **Kerry**. Do you think it would be helpful if this bill were to target some dollars for R&D assistance?

Mr. **Bieber**. Well, that may be worthwhile.

Senator **Kerry**. Mr. Chairman, I want to congratulate you for moving forward on this. I think it is a most important area.

I want to pick up on a couple of the comments of Senator Gore. I like the notion that Senator Gore talked about of perhaps our trying to be a little bit more creative in designating a different class or different approaches by which we can make some judgments here. Each year since I have been in the Senate, I have submitted acid rain legislation. Section 3 of my acid rain legislation happens to be an increase in the CAFE standards.

Mr. Chairman, you and I differ a little bit in our approaches. It is my hope, as Senator Metzenbaum hopes and I am sure you as well, that we can try to work together in order to pull together some of the thoughts here.

In your bill, I think you go up to 40 miles per gallon by 2001. Mine goes to 45 by the year 2000 but then seeks a further improvement of some 65 percent beyond the year 2000, and there are some requirements for standards beyond 2000 that I would like to see us do.

Again, picking up on what Senator Gore said, I have a tax rebate for those consumers who purchase fuel efficient cars, and also there is a tax or a penalty on inefficient luxury cars. I think it is an approach we ought to be thinking about in my legislation.

I would like to see us think about whether or not we should be creating stronger incentives here for consumer behavior and perhaps even for industry behavior as a consequence of what they will see as the marketing strategy as a result of those costs.

In addition, in my legislation there is after the collection of the penalties from the manufacturers as we currently have under current law, whereas it now goes into the general treasury, I would like to see 50 percent of that go into an R&D energy conservation fund which would be focused towards the meeting of those higher standards down the road.

What I am suggesting, Mr. Chairman, is that I have no pride of authorship here. In fact, I would like to join your bill, and I would like to be a co-sponsor. I would like to see if we can incorporate some of these other thoughts as we go along here, because we are putting 1.3 billion tons of carbon dioxide into the atmosphere. One-third of that comes from the transportation industry.

Yesterday we had a hearing in the Foreign Relations Committee in our Environment Subcommittee, talking about World Bank and IMF and other policies in order to try to influence Brazil, Amazon Forest protection and all of the other environmental problems around the world.

It is clear that these other countries are all going to point a finger at us and say, well, 25 percent of this stuff is coming from you and you are not taking adequate steps.

Over the last few years not only with a rollback in the CAFE standards but simply with the standards that have not been met, there has been an annual fleet degradation in the meeting of the standards that we have. So we are going the wrong way.

It seems to me most important that this legislation be as strong as possible in terms of incentive and that we show these other folks whom we are going to begin to call on to change their development policies that we are doing our part.

So I see this as a most important effort, and I certainly pledge to work with you in an effort to try to come up with a good piece of legislation.

Mr. BIEBER. Senator, if I might just say, I would hope that everyone recognizes that some of the things that you and Senator Gore have talked about would not necessarily improve the fleetwide fuel efficiency and that it does not discourage the outsourcing. The point that I want to leave you with is that is a real problem.

What we have been faced with is loss of jobs, moving a vehicle out of the domestic fleet and moving it into the import fleet, and you get all the pollutants, you get all the low mileage right back here in the American showroom. It does not help.

Senator **Kerry**. Let me ask you a question. Why is it going out of the import? Why is it going to the import fleet? Why is the import fleet able to satisfy that and the domestic fleet is not?

Mr. **Bieber**. Look at Ford as an example. They import the Festiva from Korea and the other small car, the Tracer, from Mexico. Those are high mileage cars, and so you can shift off that low mileage Crown Victoria by dropping below the 75 percent domestic content and you are still well within the boundaries of meeting the requirement in that import fleet.

My point is you will sell the same number of Crown Victorias in the U.S., you will get the same low mileage out of them, you will get the same pollutants out of them, but we lose jobs.

Senator **Kerry**. If I understand what Senator Gore was saying and the reason why I think it is something we want to explore is whether or not you can adjust in how we create the classes and how we create the testing standards and application thereof so that you take into account and do not in fact wind up negatively impacting what ends up.

I think there are other considerations here. I do not want to abuse my time, but it raises a lot of other questions about why who is producing what and whether or not we do not have to struggle to change some manufacturing and marketing trends in the United States.

Senator **Bryan**. Thank you very much, Senator Kerry. I can assure you we would be delighted to work with you on some approaches that are not necessarily mutually exclusive to the approach taken.

Senator **Gore**. Could I make one brief comment before Mr. Bieber leaves?

I noticed your economist talking with you prior to that last response. The size class approach if not combined with other measures might be implemented in a way that did not lead to sufficient emissions reductions over all.

I think you are right on that. That is why I suggested a combination, to think about a combination of that approach with a fee, not on gas guzzlers which we have had, which we had in the Carter Administration, but a fee on the emissions themselves. Just go right straight to the heart of the problem.

Let me give credit where credit is due. Dr. Arthur Rosenfeld at Lawrence-Berkeley Laboratory has talked for some time about a direct fee on the emissions themselves coupled with a rebate for fuel efficient cars combined with a size class. In other words, it is something that I want to explore but I wanted to acknowledge that what your staff is indicating there is a problem unless we combine approaches.

Anyway, thank you, Mr. Chairman.

Senator **Bryan**. Mr. Bieber, thank you very much for your testimony. We appreciate your being here this morning.

Our next panel will consist of Mr. William D. Cotter of the New York State Energy Office and Commissioner Warren D. Noteware, California Energy Commission.

In the interest of time, I would like to urge the panel to observe the 5-minute rule and try to impose upon ourselves the same kind of restriction so that we can get through all of these witnesses. We have a long list today.

STATEMENT OF WILLIAM D. COTTER, COMMISSIONER, NEW YORK STATE ENERGY OFFICE, ALBANY, NY, ACCOMPANIED BY PHIL METZGER, LEGISLATIVE COUNSEL

Mr. COTTER. Thank you, Mr. Chairman. With me today is Phil Metzger, the Legislative Counsel in Governor Cuomo's Washington office.

I want to thank your subcommittee for the opportunity to appear here today to present New York's position on Automotive Fuel Economy Standards. I believe that your proposal, Senator, S. 1224, if adopted could and would help New York and the nation make substantial progress against increased dependency on foreign oil and deteriorating air quality. Both problems result directly from rising gasoline consumption by the automotive portion of our transportation sector.

As has been said here by other witnesses, I have provided written comments for the committee, and I hope that they have been entered in the record, but I would like to briefly summarize the findings and recommendations.

Since the oil crises of the 1970s, New York State has been out front in innovative and effective energy conservation and efficiency programs. Since 1978 the energy efficiency of our economy has improved by more than 25 percent as we measure it by units of energy per gross state product.

We are especially proud, Mr. Chairman, of our record on energy efficiency and conservation in the building code and appliance efficiency areas. When we initiated our regulations back in the late 1970s, they were among the strictest in the nation at that time.

Our early efforts were justified in 1987 when the Congress adopted national standards for appliance efficiency that were not less stringent than our own.

We also think that we have been out front in air quality issues such as coping with acid rain. In 1984 our state adopted the Landmark State of Deposition Control Act. Last year Governor Celeste of Ohio joined with our Governor Cuomo to develop a regional approach to control acid rain.

More recently we in New York have been participating in a mobile source emissions control plan that is even stricter than that proposed under the new Clean Air Act. That program would put in place vehicle inspection requirements and tailpipe emission controls which would be among the strongest in the nation.

So, our interest in stricter automotive fuel economy measures is fully consistent with our previous record on energy efficiency and air quality issues.

This summer for the first time since 1977 and only on the fourth monthly occasion in our country's history, as most of you are well aware, more than 50 percent of the nation's oil came from foreign sources, something the experts had said would not happen until the mid-1990s.

Unfortunately for us in New York and in the Northeast generally, we rely even more heavily on foreign oil. Our latest figures at the energy office indicate foreign oil provided more than 70 percent of New York's petroleum needs last year, up from 60 percent only three years ago.

Obviously, we are extremely vulnerable in the event of world supply disruptions or price shocks, and that is a big reason that the corporate average fuel economy standards are so very important in New York and, again, in the entire Northeast.

The transportation sector in New York uses 60 percent of all the oil we consume in the state every year. The CAFE standards we think are the best means we have to attack the problem.

Since they first were implemented in 1978, CAFE standards have resulted in huge cumulative fuel savings for our state, 8½ billion gallons of gasoline. That is one and a half years' gasoline consumption at current rates, Mr. Chairman, in our state of New York.

On a daily basis CAFE standards today are saving an estimated 5.6 million gallons of gasoline in our state alone. As helpful as those standards have been, however, they just will not keep pace with the growth that we project in the use of our state's highways.

Certainly national fuel economy efforts suffered an immense setback when CAFE requirements were lowered for auto model years 1986 through 1989. A whole new wave of less efficient vehicles got onto our nation's roads.

We think the continued availability of low-priced gasoline and the resultant rise in driving will keep gasoline use in our state increasing, a full third by the year 2008, despite the existing CAFE standards.

Given our increasing dependence on foreign oil, I believe neither New York nor the nation can afford such growth in fuel consumption. Unless current trends are changed, we predict this increased transportation activity in New York also is going to result in substantial increases in carbon dioxide emissions.

We are predicting a one-third growth, also, in highway CO_2 emissions by the year 2008 in our state. It is a grave concern to many of us as it is to you, I am sure, already troubled by existing global warming reports.

Such increases in automotive fuel consumption and CO_2 are totally unacceptable to us in New York, and I think I can speak for the entire Northeast. I urge, therefore, that the federal CAFE standards be strengthened significantly beyond their current 27½ miles per gallon standards.

In our recent draft state energy plan we proposed adoption of a CAFE standard that increases one and a half miles per gallon per year for new autos rising to at least 42 miles per gallon by the year 2000. Based on expert research, much of which I understand is going to be presented here later in the day, we believe, along with you, Senator, that new car fuel economy levels of more than 40 miles per gallon by the year 2000 are both technically and economically achievable.

Our objective of 42 miles a gallon by 2000 is slightly higher than that proposed in your bill which calls, I think, for 40.2 by 2001. But I believe the bill would be a major step forward in reaching the objectives that we so sorely need.

Benefits would have particular benefit in the—the benefits would be particularly substantial in New York State by the year 2000. We would expect gasoline consumption to drop 12 to 13 percent below current levels, and mobile CO_2 emissions would be even slightly less than present levels.

In view of this alarming challenge from the transportation sector's consumption of petroleum, we have to look and we do look to the federal government for help.

I urge you and the Congress to strengthen the CAFE standards program as provided in your proposal, Senator. Such action would enormously benefit both our petroleum consumption problem and our clean air efforts in New York State.

Again, I thank you for inviting me here today to participate.

[The statement follows:]

STATEMENT OF WILLIAM D. COTTER, COMMISSIONER, NEW YORK STATE ENERGY OFFICE

NEW YORK'S RECORD ON ENERGY EFFICIENCY

Our interest in a strengthened automotive fuel economy program is fully consistent with our previous record and interest in energy efficiency. Since the oil crises of the 1970's, New York has been a nationwide leader in innovative and effective energy conservation programs. Indeed, since 1978, the overall energy efficiency of New York's economy, as measured by primary energy consumption per gross state product, improved more than 25%.

In the late 1970's, we initiated one of the strictest building code and appliance efficiency programs in the nation. Together with California, we opposed federal efforts in the early 1980's to weaken and derail those standards. Our early efforts in this field realized nationwide success in 1987 when Congress passed national appliance efficiency standards not less stringent than our own.

NATIONAL AND STATE DEPENDENCE ON IMPORTED OIL

This summer, for the first time since 1977 and only the fourth time in our history, more than half of our nation's oil supplies came from foreign sources. Most energy forecasters had not projected such a high level of foreign oil dependence until the mid-1990's. New York is even more reliant on foreign petroleum than the country as a whole. In 1985, 59 percent of New York's oil came from foreign sources. Estimates just becoming available indicate that, for 1988, foreign sources supplied over 70 percent of New York's oil.

These high levels of reliance on foreign oil place New York in a position of untenable vulnerability in the event of world oil or supply disruptions or price shocks.

IMPACT OF CAFE STANDARDS ON NEW YORK

This is one reason that Corporate Average Fuel Economy (CAFE) standards are so important to our State. The transportation sector is the driving force behind petroleum consumption in New York, consuming over 60% of the 330 million barrels of oil used annually in the State. Transportation uses more petroleum than all of the residential, industrial, commercial and utility sectors combined. CAFE standards are one of the few means available to focus directly on transportation's ravenous appetite for petroleum.

Since the implementation of CAFE standards in 1978, they have resulted in cumulative savings estimated at over 8.5 billion gallons of gasoline in New York. This is nearly one and a half year's gasoline consumption at current rates. CAFE standards now are saving an estimated 5.6 million gallons of gasoline every day in New York.

NEED FOR STRENGTHENED CAFE IN NEW YORK

As helpful as the CAFE standards have been in the past, they will not keep pace with the projected growth in use of our highways. To begin with, national fuel economy efforts suffered a setback when CAFE requirements were lowered for auto model years 1986 through 1989. As a result, a new wave of less efficient vehicles entered the market. Data for New York indicate that the average new car automobile efficiency peaked at 28.4 mpg in 1984, and then dropped to between 28.1 and 28.3 mpg over the next six years. The projected continuation of relatively low-priced gasoline and the consequent rise in vehicle usage are expected to cause annual gasoline consumption in our State to climb approximately 32 percent over the next 20 years—despite the existing CAFE standards. Given our increasing foreign oil dependence, neither New York nor the nation as a whole can afford this sort of growth in fuel consumption.

Unless current trends are altered, highway transportation activity in New York also will result in an estimated 32 percent growth in mobile CO_2 emissions by the year 2008, or 18.2 million tons over present levels of 57 million tons.

These increases in automotive fuel consumption and CO_2 emissions are unacceptable in New York. The federal CAFE standards must be strengthened significantly beyond their current 27.5 mpg standard. We propose adoption of a CAFE standard that increases 1.5 mpg per year for autos, rising to at least 42 mpg by 2000, and 58 mpg by the year 2008.

Based on the research conducted by leading authorities in the field of automotive energy, we believe new car fuel economy levels of 42 mpg by year 2000 are both technically and economically achievable.

This month, in the current edition of *Scientific American,* several researchers from the Congressional Office of Technology Assessment conclude that new car fuel economy averages could be raised readily to 33 mpg with existing technology and at little cost to the consumer. Alternatively, the researchers claim that new car fuel economy levels could be increased to 38 mpg by improving technologies at a cost equal to the value of the gasoline saved over the car's lifetime (assuming a gasoline retail cost of $1.10/gallon). If gains of this magnitude are feasible now, attaining the 42 mpg standard by year 2000 seems readily achievable, especially if the gasoline prices increase.

An earlier DOE analysis, published in 1986, found that automakers already had the technology to improve new car fuel economy to the 35 to 40 mpg level by 1995. (U.S. Dept of Energy, *Analysis of the Capabilities of Domestic Auto-Manufacturers to Improve Corporate Average Fuel Economy,* Report DOE/RL/01830-H1). A recent Transportation Research Board report concurs with the DOE findings that new car fuel economy levels that are 25 percent to 40 percent higher than the 1988 level of 28 mpg are "readily achievable." (Greene, David L., et al, "Transportation Energy to the year 2020," in Transportation Research Board of the National Research Council, *A Look Ahead: Year 2020,* Special Report 220, 1988.) Ms. Deborah Blevis, Executive Director of the International Institute for Energy Conservation, and author of an extensive study on automotive fuel economy and its technology, has discussed [or will discuss] before you here today her findings that new car fuel economy levels of 45 mpg by 2000 are achievable. Virtually all these sources concur that achievement of fuel economy in 40 mpg range is market-constrained—and not technology-limited.

Indeed, the Alliance to Save Energy, the Energy Conservation Coalition, and the National Resources Defense Council joined the American Council for an Energy-Efficient Economy this past July in calling for an auto fuel economy goal of 45 mpg by 2000, slightly higher than our proposal.

Our auto fuel economy objective of 42 mpg by 2000 is slightly higher than that proposed in Senator Bryan's bill, which envisions a level of 40.2 mpg by 2001. Nonetheless, we feel that S.1224 would be a major step forward in reaching our objectives.

The benefits of a CAFE program which increased its annual requirement by 1.5 mpg per year, to reach the 42 mpg range by 2000, would be substantial for New York. By the year 2000, gasoline consumption could be expected to drop 12 percent below current levels, to 3.6 billion gallons; mobile CO_2 emissions would decrease by about 3 percent below present levels, to about 55.3 million tons annually.

If the CAFE level continued to increase by 1.5 mpg/year, by 2008, gasoline consumption would drop nearly 14 percent below current levels, while mobile CO_2 production would be held about equal to its 1988 levels, despite major increases in vehicle usage on highways.

NEW YORK'S RECORD ON AIR QUALITY

We have been in the forefront of a variety of air quality issues, such as coping with the impact of acid rain. In 1984, New York adopted the landmark State Acid Deposition Control Act as a means of developing State measures to cope with the problem. Over the past year, the Governor of Ohio has joined with our Governor to develop a regional approach to control acid rain through a group of measures known as "the Cuomo-Celeste proposals."

This past February, Governor Cuomo, along with the governors of Vermont, and New Jersey and the National Governor's Association sponsored a major conference on Global Warming. Among its formally adopted goals were a 20 percent reduction of all CO_2 emissions by 2000 as well as achievement of higher automotive fuel economy levels.

Recently, we announced our preference for participation in an alternate and stricter mobile source emissions control plan. That program, organized by the Northeast States for Coordinated Air Use Management (NESCAUM) and our Department of Environmental Conservation, and based on California's experience, proposes vehicle inspection requirements and controls on tailpipe emissions that are among the strongest in the nation.

We also have an active and growing program in the search for clean alternative transportation fuels. I would like to submit [1] for your consideration the relevant portions of our recent draft State Energy Plan which discuss fuel consumption and air quality as they relate to transportation in greater detail.

In summary, New York has long strived for energy efficiency and improved air quality. We are now confronted with an unprecedented challenge from our transportation sector and its consumption of petroleum. This is presently an area in which states must defer to the Federal government action. We are, therefore, urging Congress to take steps to strengthen the CAFE standards program, increasing it at a rate of 1.5 mpg per year, so as to reach at least 42 mpg by the year 2000. Such action would have enormous beneficial impact on both our State's petroleum consumption and mobile carbon dioxide emissions situation.

Senator BRYAN. Thank you very much, Commissioner Cotter. We will hear from Commissioner Noteware next.

STATEMENT OF WARREN D. NOTEWARE, COMMISSIONER, CALIFORNIA ENERGY COMMISSION, SACRAMENTO, CA

Mr. NOTEWARE. Thank you, Mr. Chairman. Your bill before us today can contribute to solving major policy issues we face in the use of oil in several distinct areas such as security of supply, price stability, conservation of a depletable resource, air quality and even potential climate change.

California is just too dependent on petroleum. Our transportation activity is increasing faster than our population, and the rate of improvements in vehicle fuel economy has slowed. Therefore, significant future growth in demand for transportation fuels is expected if present trends continue.

California's current oil supplies now are provided about equally from in-state and Alaskan production. They are certain to decline over the next 20 years, forcing the state to import increasing amounts of foreign oil to make up the difference and to meet our increasing demand.

While most long-run oil price forecasts today are lower than forecasts of two or three years ago, the Energy Commission and others still predict a long-term upward trend in oil prices with the path likely to be very erratic. Oil price forecasts are notoriously uncertain, and it is the economic risk associated with that uncertainty that California and the nation must try to reduce.

California was extremely dependent on oil in the early 1970s, and California and the nation were severely hurt by the run-up in oil prices in 1974 and 1980. So, for the long-run health of our economy, it is imperative that we take steps to avoid the reoccurrence of that kind of economic disaster.

Vehicles contribute significantly to air emissions in California's urban areas, and while efficiency does not directly correlate with emissions, it is imperative that both fuel consumption and emissions be reduced.

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[1] The submission was not reproducible.

Past improvements in vehicle emissions control technologies have significantly reduced transportation emissions, although transportation-related pollution levels still contribute significantly to violations of ambient air quality standards in many urban areas of our state, and as with fuel economy improvements, future growth in the number of vehicles and vehicle miles traveled will overcome these emissions control gains as well.

Global warming also is greatly affected by vehicle efficiency because combustion of fossil fuels releases carbon dioxide. To reduce the air quality impact of our transportation system, California is moving aggressively to increase the use of non-petroleum fuels, to develop alternate transportation modes to replace private vehicle use, and to improve vehicle fuel economy.

As you may be aware, California has been on the forefront of developing markets for alternative fuel vehicles, especially methanol. In addition, in July Governor Deukmejian signed into law a comprehensive package of the legislation that will greatly expand the state's efforts in improving the transportation system.

But, California is also extremely interested in improving the efficiency of conventionally fueled vehicles by using the growing array of new technologies such as better transmissions and other drive train components, two-stroke or multi-valve engines, lighter materials and better aerodynamics and tires.

How to improve and implement vehicle efficiency improvements is really the challenge. Policymakers around the country are struggling with standards and incentives other than standards that can result in more efficient and cleaner vehicles.

The basic problem as we see it is that the cost to consumers of using vehicles does not include what you could call a risk premium for increasing dependence on imported oil nor an environmental premium for using polluting fuels. As in most situations involving market failures to internalize these costs, policymakers must look to a mix of mandates, incentives and subsidies to create an economically and environmentally sound future. None can be very popular politically, but they are steps we must take.

In the case of vehicle efficiency, we know the standard list of policy measures that are available to us, such as increasing CAFE standards, increasing gasoline taxes, implementing a gas guzzler tax/gas sipper rebate and others.

As part of the governor's comprehensive transportation package, gasoline taxes in California will be increased almost 60 percent in 1991 and increase 1 cent per gallon every year through 1995. While this tax is a revenue enhancement mechanism to pay for needed improvements in our transportation system, it will also increase the incentive to use fuels more efficiently.

In addition, there is state legislation in California similar to what Senator Gore was talking about that would implement a gas guzzler tax/gas sipper rebate.

California is limited, however, in our options to directly address the fuel economy problem due to the preemption provisions included in the federal CAFE statute. Therefore, we ask Congress and the President to take appropriate action to increase the CAFE standards to levels that would be cost-effective to consumers and which are achievable by industry.

While we have not undertaken a detailed review of the economic and engineering implications of vehicle technology, we have reviewed the work of Steve Plotkin of the Office of Technology Assessment and others, and we believe that vehicles can be significantly more efficient and still meet the needs of U.S. drivers.

While it is difficult for us to pin down specific miles per gallon standards, the requirement of S. 1224 appear to strike a reasonable balance between our economic and environmental goals, and the ability of the auto industry to meet the standards.

The fact that this bill contains provisions for modifying the standards if unforeseen conditions should occur and that it provides targets several years in advance of their implementation will make this legislation more achievable and enforceable.

As a result, the Energy Commission supports S. 1224. Thank you.

Senator BRYAN. Thank you very much, Commissioner Noteware.

Mr. Cotter, you in your prepared testimony—and you made reference to it in your oral summary—are recommending that we increase on an incremental basis 1.5 miles per gallon each year up to I believe it is 42 miles per gallon by the year 2000. Do I have your testimony correctly stated?

Mr. COTTER. That is right, Senator.

Senator BRYAN. You have heard from Mr. Bieber and undoubtedly have read the testimony or will hear the testimony from the auto industry that say that simply that cannot be achieved without radical redesign of the American automobile or some extraordinary technological breakthrough.

My question is twofold: On the incremental annual increase, it is argued that because the product lines that are developed are set two, three, four, five years in the future, that requesting an annual increase is really not the way to go, although that is the way we went with the original CAFE legislation, as you know; and that the 42 miles per gallon, in any event, is beyond capability.

Can you respond to the criticism of the incremental increase, and share the basis upon which your confidence is predicated that we can get to 42 miles per gallon?

Mr. COTTER. We just—of course, our position is that we are so immersed in foreign oil. In New York we are strictly an energy importing state as you we know, and the businesses, the homeowners and the industry of our state are spending upwards of $20 billion a year just to buy end use energy.

We do not particularly care how we arrive. All we are saying is that we would like to arrive at the turn of the century at the same point that you would like to arrive, and that is we say 42, you say 40½.

We think from all the experts that we have talked to—and we have talked to many of them as we put together our new draft energy plan which looks ahead for 20 years and is the first complete look we have done in several years. We think that it is technologically feasible, despite the evidence that we might hear to the contrary. We think we are hearing a lot of the same evidence that we heard back in the seventies and as has been pointed out here, we met the requirements.

I think that the economic problems are complicated. Your subcommittee is going to have to take a good close look at all of it, but

I think nothing is insurmountable, and the goals are certainly very, very important.

Cutting back on foreign oil—70 percent now in New York State—cutting back on CO_2 emissions takes precedence as far as we are concerned, and we would like to see us get there one way or the other.

Senator Bryan. Mr. Cotter, I could not agree more with your observation. Clearly, as you point out in your testimony, if we do nothing, it is not a question of the status quo remaining in effect. We will actually lose ground because of the increased vehicle miles traveled, and our energy dependence will grow, and the emission level from CO_2s and other emissions will continue to rise.

And so, the other question that I have is, the industry frequently argues that automotive emissions constitute but a small part of the overall problem. Therefore, they should not be singled out.

Therefore, Mr. Cotter, if you would respond to that argument, and if I could get you to respond as well, Mr. Noteware.

Mr. Cotter. Well, at the 330 million barrels of petroleum that we use in New York State every year, 60 percent, as I said, is in transportation. And, as we all know, no matter how we might try to deprioritize it, CO_2 is the big emission coming from all of that.

What is even worse is that in New York State we are predicting a 68 percent increase in vehicles miles traveled by the turn of the century. Unless something gives, Senator, I think our priorities tell us which is more important. I think we have to consider CO_2. I think Senator Gore is talking about a rebate based strictly on that. I would—I think Senator Gore's number 4 proposition is very interesting—I will take it back—we will take it back and we will think a lot about that. But I would hope that if anything like that is included in the legislation that gasoline preservation would also be included and not just the CO_2 emissions.

Senator Bryan. Mr. Noteware.

Mr. Noteware. New York's 60 percent corresponds to California's 75 percent of the amount.

Senator Bryan. That would be an increase in vehicle miles traveled, Mr. Noteware? You are talking about a 75 percent increase?

Mr. Noteware. 75 percent of the oil used in California is used in transportation. As I understood Mr. Cotter, in New York it is 60 percent, and so we are equally concerned, obviously.

The states can also follow the lead that Mr. Gore has suggested. In fact, in California there has been a bill introduced by our State Senator Hart, Senate bill 16[illegible], which provides for—that this same type of a thing on an annual registration fee basis in which the gas guzzlers, owners of gas guzzlers pay more for a smaller fee going to the owners of fuel-efficient cars.

Senator Bryan. Maybe you could share with the subcommittee what you project the impact would be. You talk about three or four things that are rather innovative. You talk about the increase in the vehicle fee registration. You are talking about a gas sipper rebate and, conversely, an increase in the cost of gas and perhaps some additional penalties.

Share with us from the California perspective what that would do in terms of reducing oil consumption or at least holding the increase below the percentages that are projected. What do your numbers show?

Mr. **NOTEWARE**. Earlier this morning Senator Nichols made a good point that one of the reasons for the increased efficiency probably was due to the rapid increase in price of gasoline in the seventies.

While California's increase in gasoline tax is going primarily toward improving the infrastructure, the roads and so forth, still we feel that that is going to create an incentive for the consumer to buy more efficient, more fuel-efficient cars.

Senator **BRYAN**. Have you been able to quantify that at all? How much is your increase in gas tax? How is it phased in?

And I realize I am encroaching upon Senator Gorton's time, but if I could, I think it is important that our record, since we have you, reflect what your own analysis indicates will be the result of that increase in tax and these other alternatives that are suggested.

Mr. **NOTEWARE**. I am sorry, Senator Bryan. We have not made an independent study. We have referred quite extensively to Steve Plotkins' study from the Office of Technology Assessment which we reviewed in the May hearing.

Senator **BRYAN**. What is the increase in fuel tax that has been enacted into law in California?

Mr. **NOTEWARE**. It is 60 percent over what it is now, and it is going to go up at the rate of 1 cent per year.

Senator **BRYAN**. So that is built in. That is an automatic 1 cent increase annually?

Mr. **NOTEWARE**. Yes, that is right, 1 cent per gallon every year through 1995.

Senator **BRYAN**. It is law; barring a legislative change it will automatically occur?

Mr. **NOTEWARE**. Yes. That was signed into law as a comprehensive package. There are several other things included with that.

Senator **BRYAN**. Would you explain the concept for me of the gas sipper rebate, how that would work mechanically?

Mr. **NOTEWARE**. When the time comes to register your car, the registration fee is based upon the size of the vehicle, the age of the vehicle, and a number of other things. The efficiency in miles per gallon would be entered into the equation in such a way that there would be a balance. It is not a revenue enhancement type thing. It is supposed to be revenue neutral.

Senator **BRYAN**. Pardon my interruption. Does the legislation include not only an increased vehicle registration tax for less fuel efficient vehicles, but also a rebate mechanism for those that are more efficient?

Mr. **NOTEWARE**. It probably would not be a rebate. It would represent less of a tax to pay or less of a registration fee to pay. You would not get down below the zero point, though, so that you would get any money back.

Senator **BRYAN**. Are you familiar with the gas sipper rebate concept that has been discussed here briefly this morning? If you are, tell us how that would work even though that is not part of the legislation.

Mr. NOTEWARE. As I understand it, that would come at the time you purchase a new car, and it would be in the form of a rebate like the auto companies give now as an incentive to buy. The rebate would be proportionately higher as the car that you are purchasing becomes more efficient.

Senator BRYAN. Thank you very much.

Senator Gorton.

Senator GORTON. Some critics say that we have to make a very real tradeoff between emission controls of the type that are called for by the President's proposals for the Clean Air Act and automobile fuel efficiency.

Do you, too, believe that improved fuel economy is fundamentally inconsistent with improved emission controls?

Mr. NOTEWARE. Increased fuel economy relative to emission controls I think falls into about three different categories. There are some that are not compatible. In other words, you do have to sacrifice economy to get the emission controls. That is not the case with other technologies.

I think a third category is one in which you can achieve the emission controls at a higher price without destroying the fuel efficiency. So I do not see it as being a definite tradeoff. If it were or on those technologies in which it probably is, then I think there are some tough decisions to be made, but I think we should explore every conceivable way to increase the fuel efficiency and also the emission controls at the same time where they are not mutually exclusive even if it means a slight increase in price.

Senator GORTON. Mr. Cotter.

Mr. COTTER. Senator, I think that there is a consistency there. I think fuel efficiency and emissions go hand in hand.

I mentioned earlier in my testimony NESCAUM. I am not sure if you are familiar with that group. That is the Northeast States Coordinating Air Use Management, NESCAUM; New York, New England and New Jersey in a consortium to come up with just such regulations, more rigid than those in the Clean Air Act. It will be submitted as an amendment to our State implementation plan, and EPA would of course have to approve that.

We have been working on that very thing, and our experience so far has told us that when you improve the efficiency of burning fuel you will also improve emissions.

Senator GORTON. Mr. Noteware, you made an intriguing answer to that question, stating that there are three different possible combinations, some areas where you do trade off, some areas where better fuel efficiency means better emission control, and others where the relationship is more complicated.

Do you have or could you provide us with a 1- or 2-page paper which outlines some examples of each of those three sets that you have just outlined?

Mr. NOTEWARE. Yes, I think I can.

Senator GORTON. I would greatly appreciate your doing that at your convenience.

Mr. NOTEWARE. All right.

[The following information was subsequently received for the record:]

California Energy Commission,
Sacramento, CA, September 18, 1989.

Hon. Slade Gorton,
U.S. Senate, Hart Senate Office Building—SH-730, Washington, DC.

Dear Senator Gorton: Following my testimony last week on S. 1224, I agreed to send a sumary of some of the technologies that I felt would not require a trade off between efficiency and emission control, some that would, and some for which there would be a cost to achieve emission controls while increasing fuel efficiency.

Obviously, the point I was making was that we should not assume that increasing CAFE standards would automatically contribute to air pollution.

Measures that can be taken to improve efficiency that have no effect on tailpipe emissions are such things as: Better aerodynamics, reduced frontal area, lighter weight, improved lubricants, improved transmissions (including greater use of 4-speed automatics) and improved drivetrains, improved tires, brakes, and bearings.

However, many engine design and emission control strategies have indeed resulted in substantially reduced engine performance and fuel economy in the attainment of the 1980 exhaust emission standards of 0.39/9.0/1.0 grams/mile (Hydrocarbons (HC)/Carbon Monoxide (CO)/Oxides of Nitrogen (NO_x), respectively. These strategies included: Reduced compression (for reduced NO_x emissions), exhaust gas recirculation (EGR) at high flow rates (for reduced NO_x), air injection pumps continuously operated (for reduced HC and CO emissions), Retárded ignition and value timing (for reduced NO_x).

It should be noted that the loss of performance caused by implementing these strategies has been completely overcome, and the average 1989 projected emissions for light-duty vehicles are: 0.19/2.33/0.27 grams/mile (HC/CO/NO_x), well below the standards of 0.39/7.0/0.4. To arrive at such emission control while achieving the greatest fuel economy that vehicles have ever achieved has required some technological improvements which have increased the cost of new cars. These include: Electronic port fuel injection, Electronic distributors, knock sensors, Catalytic converters.

The potential for further improvement in fuel economy depends upon development of strategies that may add even more to the cost (for instance, the royalty payments that may be required for the use of the Orbital engine or other patented technologies).

The impressive gains that have been made in emission control need not be sacrificed for increased fuel effciency. Market competition is a major force dictating the design of vehicles to exceed the standards, and legislation such as S. 1224 will encourage creative solutions.

Thank you for the opportunity to expand upon my testimony. I appreciate being able to testify and to share California's concerns.

Sincerely,

Warren D. Noteware,
Commissioner.

Senator **Gorton**. Thank you, Mr. Chairman.

Senator **Bryan**. Thank you very much, Senator Gorton.

Gentlemen, thank you very much. There may be some additional questions which Members of the committee have of you, and we would certainly appreciate your response to those questions.

I would like to congratulate each of you for the leadership role you are playing in your states in the area of energy conservation and particularly as it relates to fuel efficiency and emission control.

Mr. **Cotter**. Thank you very much, Senator.

Mr. **Noteware**. Thank you.

Senator **Bryan**. Our next panel will consist of Mr. James J. MacKenzie, Senior Associate, Climate, Energy and Pollution Program, World Resources Institute; Mr. Brooks Yeager, Vice President, Governmental Affairs, National Audubon Society; and Ms. Deborah Bleviss, Executive Director, International Institute for Energy Conservation.

We will begin our testimony with you, Mr. MacKenzie.

STATEMENT OF DR. JAMES J. MacKENZIE, SENIOR ASSOCIATE, CLIMATE, ENERGY & POLLUTION PROGRAM, WORLD RESOURCES INSTITUTE

Dr. **MacKenzie**. Thank you, Mr. Chairman. I appreciate the opportunity to be here today. I am a senior associate at World Resources' Climate, Energy & Pollution Program. My views today are my own. The Institute has no official policy on these issues.

There are just a few points that I would like to make with you in summarizing my testimony. Much of what I have has been covered by yourself and other committee members and by other testimony.

The first is that, indeed, the oil problem is getting more and more serious. Oil demand continues to rise. Gasoline and other transportation fuels are a major part of that problem, as you have heard, two-thirds. Domestic production continues to decline. I include in my testimony evidence of that.

Alaskan production is now going down. It has gone down every month this year compared with last year. The decline in domestic oil resources is not for lack of trying. All during the 1970s with high oil prices, up through 1985, we had an unprecedented exploratory effort, and yet reserves declined as did the success rate in finding oil.

So my conclusion is that we face a gloomy domestic oil future. As you have heard today, imports are increasing, and most of the remaining oil in the world, the surplus oil, is in the Middle East and the Persian Gulf. In fact, our imports from the Persian Gulf now are twice in absolute terms what they were before the 1973 embargo.

So the principal conclusion of this is that transportation either becomes highly more efficient to deal with this problem or else we have to start thinking about other energy sources for transportation other than simply oil. I will come back to that as I tie this together at the end of my testimony.

I think that two issues, climate change and energy security, are going to dominate energy policymaking for the foreseeable future. As you are quite aware, transportation is a large part of these problems. It is almost a third of our carbon dioxide emissions, and when you throw in other transportation in with the other gases—the CFCs, the ozone, and carbon monoxide, which indirectly contribute—you see that transportation is a major part of the climate problem.

The Environmental Protection Agency has indicated that to stabilize the carbon dioxide levels in the atmosphere would require reductions of emissions of 50 to 80 percent. That, it seems to me, is a very sobering conclusion and begins to provide the context of what we are about with legislation like this.

What are our goals? What can we hope to accomplish through improvements in fuel efficiency? To stay even, or to reduce them? I think that we have a responsibility and the opportunity for showing leadership in this area because we are the world's largest consumer of fossil fuels. Our per capita emissions are on the order of five times the world average.

What I have done is to present the results of some calculations in my testimony in which I model some of the improvements in fuel efficiency for the next 20 years and try to see what that implies for carbon dioxide and fuel use.

I did some calculations with a colleague, Michael Walsh, who is not here today, and we examined a goal of reducing U.S. carbon dioxide emissions from automobiles, relative to 1986, by 20 percent, which was a goal that was adopted in a conference in Toronto last year. We assumed that traffic would increase at 2.7 percent per year, which it has for most of this decade, and our results are pretty gloomy.

We found that, assuming annual compounding of new car fuel efficiency, rather than the sort of step functions that are in the proposed legislation, you would have to get about a 55 mile per gallon new car, by the year 2005, to meet a reduction goal of 20 percent. That is on-the-road. That does not reflect the inaccuracies or the biases in the EPA test procedure which would probably up it to someplace between 60 and 80 miles per gallon.

So that provides the context for this legislation, the kinds of standards that are being proposed here.

I then performed additional calculations using the most optimistic levels that might be achieved in fuel efficiencies, and I modeled those against growth in vehicle miles traveled just to see what might be achieved.

I took the 2.7 percent vehicle miles traveled for the past eight years, and I asked: what does that do to gasoline use? The answer is it roughly holds it constant. There is a slight increase until the first jump in 1996, and it sort of slows it down for a couple of years and then starts back up again. Then when the second jump comes, it slows it down for another few years, and then it goes up. My conclusion is: absent further improvements, gasoline use will go up given this 2.7 percent growth in vehicle miles traveled.

I then said, well, that is fine. Let us look at various possibilities, a 1 percent growth, 2, 3 and 4 percent growth in vehicle miles traveled. That is my last figure. Basically, I found that for 2, 3 or 4 percent growth the fuel use will continue to rise; 2 percent shows just a slight decline, but 3 and 4 percent will definitely go up, and it would require on the order of a 1 percent growth in vehicle miles traveled in order to substantially reduce carbon dioxide emissions and oil use.

Now this is to be compared with the last two years of our historical record when in fact things are going up. U.S. emissions are going up not only in absolute terms but as a fraction of total global carbon dioxide emissions. We are now approaching 24 percent of global carbon dioxide emissions. As I have indicated previously, transportation is a good part of that.

So my conclusion is that this is a terribly important issue. It is absolutely essential if we are to deal with global warming to get this problem under control. This bill is an important first step, but I think that these types of calculations suggest that we also have to work on other parts of the system. We have to start controlling vehicle miles traveled.

We just heard that California is expecting a 60 percent growth. I do not see how they can possibly hope to cope with that. So I think that this kind of legislation has to be supplemented with the beginnings of a transportation strategy or policy which will encourage higher system efficiency, more high occupancy vehicles, more public transit. This is very much a local issue in that each community, each major urban area is going to have to be dealt with individually. But I think that has to be part of the long-term solution.

The other message that I get from this is that we eventually are going to reach technological limits as to how efficient these vehicles can be. After all, the reason we are pushing fuel efficiency is because of oil security and climate warming. If we were to change sources to things like electric vehicles where the electricity was provided, for example, by renewable resources, or hydrogen provided by renewable resources, then much of this problem goes away, and you can then have your larger vehicles.

So the other part in addition to improving system efficiency that I think we have to seriously engage in is the development of these alternative fuel vehicles. That, by the way, does not include methanol, whose impacts on carbon dioxide emissions are about the same as gasoline and which is going to be imported in any case and so would not relieve us of the economic or security risk from importing oil.

In terms of the details of the legislation, my own personal view is that this kind of legislation could and should be supplemented with economic incentives so that consumers are genuinely interested in purchasing the more fuel efficient vehicles. I think that things such as fuel taxes and gas guzzler/gas sipper taxes, all make sense within this context of providing incentives.

[The statement follows:]

STATEMENT OF JAMES J. MACKENZIE, PH.D., SENIOR ASSOCIATE, CLIMATE, ENERGY, AND POLLUTION PROGRAM, WORLD RESOURCES INSTITUTE

Mr. Chairman and members of the Committee, thank you for inviting me to testify this morning on Senate 1224, the Motor Vehicle Fuel Efficiency Act of 1989.

I strongly endorse the goals of this legislation: to improve the fuel efficiency of the U.S. fleet of automobiles and other passenger vehicles such as mini-vans and light duty trucks. Such improvements will be essential in reducing the Nation's dependence on foreign oil. Improved fuel efficiency is also essential in cutting U.S. transportation carbon dioxide (CO_2) emissions. Carbon dioxide is the principal gas leading to enhanced global warming and climate change. I would like this morning to comment briefly on the relevance of these two issues to this legislation. I will also present the results of some calculations that I performed on the likely impacts on gasoline use of the proposed fuel efficiency standards.

Deterioration of U.S. Oil Security

The Nation's oil security continues to deteriorate as domestic petroleum demand rises while domestic production continues to fall. Figure 1 shows demand and import trends since 1982. Total U.S. oil demand has risen 13 percent from 15.3 million barrels per day (mmb/d) in 1982 to 17.3 mmb/d in 1988.

It is expected to rise another 1.6 percent in 1989.[1] Despite improvements in new-car fuel efficiency, gasoline use over this period has increased 12 percent and is expected to rise an additional one percent in 1989.

Meanwhile, petroleum imports continue on an upward trend. Oil imports have risen 53 percent from 4.3 mmb/d in 1982 to 6.6 mmb/d in 1988. See Figure 1. Imports are expected to rise by another 10 percent in 1989. Petroleum imports will account for about 40 percent of our oil supply this year; they were only 35 percent of supply before the embargo of 1973. Worse, our oil imports from the volatile Persian Gulf region in 1988 (1.8 mmb/d) were twice what they were in 1973 (0.9 mmb/d).[2]

The reason for our growing oil dependence is readily apparent. The United States is simply finding and producing less oil each year. Domestic oil trends are shown in Figure 2.[3] The middle curve shows annual oil production in the lower 48 states. Production in the lower 48 states peaked in 1970 and, with the exception of two years, has been declining since. Alaskan oil production also appears to have peaked. Month for month, crude production in Alaska in 1989 has been less than what it was in 1988, the peak year in production to date.

The decline in U.S. oil production has not occurred for a lack of exploration and drilling. Figure 3 shows the trends for the lower 48 states in total oil and gas drilling and proved oil reserves.[4] Despite the accelerated drilling effort for oil and gas that occurred throughout the 1970s up through 1985, crude reserves continued their long trend of decline. (Note that the jump between 1979 and 1980 was simply the result of a change in reporting procedures on the part of the Department of Energy.) Figure 4 shows the declining success rate in finding oil in the lower 48 states. Per foot drilled, less and less oil is being found. The straight line represents the best linear fit to this historical trend.

The message from this analysis is starkly clear. The United States is running out of oil and must either curb its use of oil or face the security and financial consequences of increased petroleum imports. And lest there be any doubt, Figure 5 shows that the great bulk of the world's remaining oil reserves are in the Middle East.[5] Moreover, with the Soviet Union, presently the world's largest oil producer, nearing its peak in oil production, it is quite possible that the two superpowers will find themselves competing for Middle East oil in the years ahead.

Where can oil demand most effectively be reduced? Figure 6 shows the consuming sectors of oil in the United States.[6] In 1988, transportation accounted for 62 percent of U.S. oil demand. With the relatively quick turnover of the motor vehicle fleet, transportation is the obvious place to look for major savings. Let me turn now to the role of U.S. transportation in global climate change.

U.S. Transportation and Global Warming

The United States is the single largest contributor to global warming, and transportation is one of the largest sources of several important greenhouse gases. Figure 7 shows EPA's estimate of the contributions of various parts of the world to global warming.[7] The figure shows that the United States accounts for more than 20 percent of the worldwide total. In my view, the United States as the industrial leader of the free world can play an important role in solving the greenhouse problem. This Nation can assume a leadership role in climate change by leading the development of the highly efficient and renewable technologies that will allow us to cut greenhouse gas emissions while maintaining, indeed, improving our quality of life.

Figure 8 shows the contribution of U.S. transportation activities to our CO_2 emissions. Transportation accounts for almost a third of U.S. releases and by itself is a larger source of CO_2 than the total fossil fuel emissions of many other nations. The trend, moreover, is upward. Figure 9 shows that since 1984, CO_2 emissions from transportation have grown by almost 50 million tons (as carbon) per year.[8]

This trend of increased fuel use should come as no surprise. As Figure 10 shows, in real terms, gasoline prices have been dropping since 1981 and in 1988 were lower than they have ever been in the past.[9] Lower fuel prices combined with a leveling off of the CAFE requirements (Figure 10) are the principal reasons why gasoline demand is rising along with oil imports and CO_2 emissions.

How can we reverse these threatening trends? I fear it will not be easy. There are two factors that must be taken into account in devising an effective strategy to reduce overall transportation fuel use. The first is the fuel efficiency of new autos and trucks; the second is the future growth in traffic. Increasing the fuel efficiency of new light-duty vehicles is the primary goal of Senate 1224. I applaud this effort, though I fear that, by itself, this legislation does not go far enough and will not sufficiently reduce emissions to offset the long-term growth in traffic (vehicle miles traveled, VMT).

Continued growth in the number of vehicles and the resulting vehicle miles traveled has been the undoing of national efforts to improve overall national fuel efficiency and reduce oil consumption. The United States has doubled the fuel efficiency of new passenger autos since 1973. Despite this improvement, gasoline use has increased by 10 percent, largely as the result of a 33 percent growth in VMT.

Thus, vehicle miles traveled must also be addressed in any integrated national strategy to slow or reduce transportation oil consumption. If the number of vehicle miles traveled by light duty vehicles grows substantially over the coming years, then the new-car MPG will also have to grow significantly if total fuel use is to remain constant or, better still, be reduced.

A colleague, Michael P. Walsh, and I have recently performed calculations of the new-car fuel efficiencies that would be required to meet a hypothetical goal of reducing passenger car fuel use (and, therefore, carbon dioxide emissions) by 20 percent by the year 2005 relative to 1986 levels (the goal adopted by the 1988 international Toronto conference, "The Changing Atmosphere: Implications for Global Security"). Our calculations will shortly be submitted to a refereed scientific journal for publication, but I will summarize the results for you now. Basically we found that if passenger car VMT continue to grow at the 1980-1986 rate of 2.7 percent per year, then new-car MPG would have to increase (assuming a constant annual compounding) to 55 mpg by the year 2005 in order to meet the stated goal of a 20 percent reduction in CO_2 emissions. Because of the acknowledged tendency of EPA's measurement procedures to overestimate actual on-the-road fuel efficiencies, the 55 MPG fuel efficiency that we calculated would translate to somewhere between 65 and 80 MPG when measured by EPA test procedures. These values should be compared with the CAFE standard proposed in Senate 1224 of not more than 40 MPG for the period 1995-2000 and not more than 45 MPG measured by EPA test procedures for the years 2001 and later.

In preparation for this hearing I performed additional calculations on passenger car fuel consumption using the proposed CAFE fuel efficiencies in S. 1224. I assumed that from 1995 through the year 2000 the average fuel efficiency of new cars would average 40 MPG (reduced by 10 percent to 36 MPG to reflect on-the-road experience.) From 2001 through 2010 I assumed a fuel efficiency of 45 MPG (reduced by 15 percent to 38.2 MPG). I believe that these assumptions would represent the most favorable circumstances for fuel efficiency improvement under S. 1224. Figure 11 shows the resulting gasoline consumption assuming that VMT continues to grow by 2.7 percent per year, the average growth rate for 1980-1986. One sees that the two jumps in fuel efficiency occurring at 1995 and 2001 have the effect of cutting overall fuel use slightly for 3 to 4 years but that the growth in VMT soon overwhelms these improvements. By the year 2010, gasoline use is 3 percent over that of 1986. Without further fuel efficiency improvements, gasoline consumption will continue to increase with growth in vehicle miles traveled.

To examine the effects of VMT growth I performed additional calculations varying the future growth rate in VMT. Figure 12 shows gasoline consumption for the years 1986, 1995, 2000, 2005 and 2010 for VMT growing annually by 1, 2, 3, and 4 percent per year. It is clear that for the higher growth rates (2, 3, and 4 percent per year) gasoline consumption declines only slightly (2 percent), increases slightly (3 percent), or takes off dramatically (4 percent). In the 4 percent case, gasoline use would increase by about 40 percent above 1986 levels by 2010. Only in the case of 1 percent VMT growth does gasoline use come down significantly, about 31 percent by the year 2010.

The message of this analysis is clear. There is an important relationship between fuel efficiency improvements and growth in VMT. If VMT continues to grow at a significant rate, major improvements in new car fuel efficiency will have to be continually achieved to control gasoline use and carbon dioxide emissions. Simultaneously reducing VMT growth and improving new-car fuel efficiency appears to be the only way to achieve significant reductions in gasoline demand and carbon dioxide emissions.

It is for these reasons that I conclude that S. 1224 is an important step forward in confronting the linked problems of oil security and global warming but that it needs to be supplemented with a comprehensive national strategy to reduce the growth in passenger-vehicle VMT. The Department of Transportation is presently developing a national transportation policy. It is essential that this policy recognize the fundamental changes that will be needed in transportation and land use planning if we are to successfully cope with the linked threats of oil dependency and climate change. A rational transportation policy must emphasize improved efficiency not only for individual vehicles but for the system as a whole. This will require a fundamentally different kind of thinking from that of the past and will almost certainly require changes in land use practices to allow people to drive less in their daily routines.

Lastly, we must accelerate the introduction of new non-fossil technologies for transportation. Not just for ourselves, but as an integral part of an international approach to solving the problem of greenhouse warming. In this connection I must state that the widespread deployment of methanol vehicles will do little or nothing to ease our dependency on foreign energy sources and it will certainly not help reduce global warming. The methanol will all be imported, and methanol vehicles will lead to comparable amounts of CO_2 emitted per vehicle mile traveled when conversion losses from natural gas to methanol are taken into account. For these reasons the relaxation of CAFE requirements for methanol vehicles was, in my opinion, a mistake and will ultimately lead to more global warming as the automakers take advantage of the inflated fuel efficiencies attributed to methanol vehicles. Far preferable would be the introduction of electric vehicles and/or hydrogen powered vehicles with the energy ultimately derived from renewable or nuclear sources. These are both promising candidates for the transportation systems of the future. We should be pursuing their development with the same vigor that will be needed to improve the fuel efficiency of our petroleum dependent vehicles for the next 10 to 20 years.

REFERENCES

1. "Midyear Forecast and Review," Oil and Gas Journal, July 31, 1989, pp. 55 ff.

2. U.S. DOE, Monthly Energy Review, March 1989, Table 1.8 "U.S. Dependence on Petroleum Net Imports."

3. DOE data from Monthly Energy Review, March 1989, and Annual Energy Review, 1987.

4. Drilling data from DOE's Monthly Energy Review; proven reserves data from "Twentieth Century Petroleum Statistics," DeGolyer and MacNaughton, and "U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves." DOE/EIA.

5. Data from "BP Statistical Review of World Energy," June 1988.

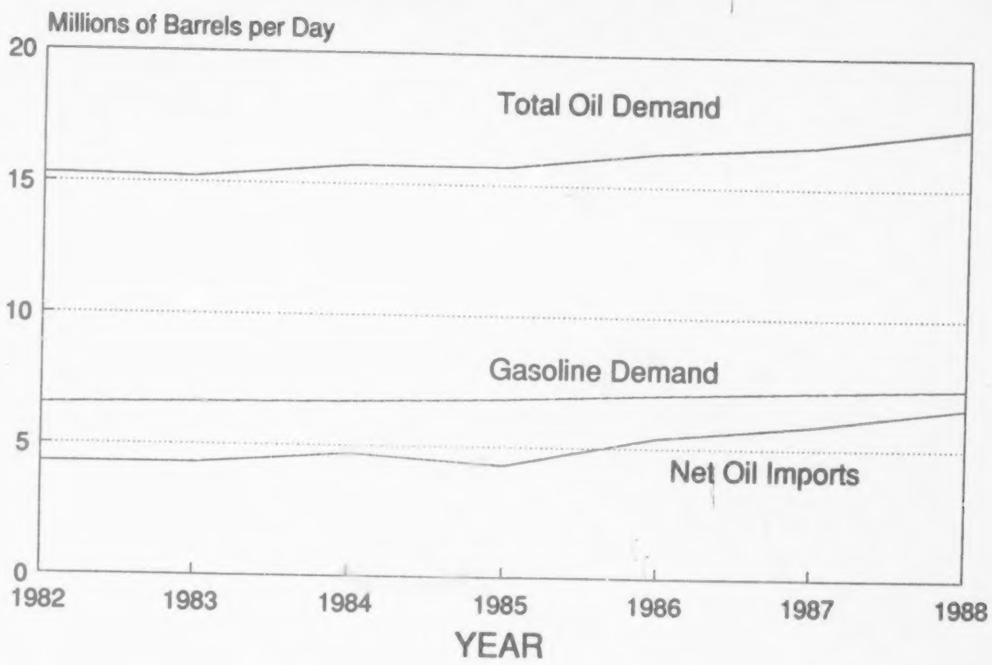
6. DOE Monthly Energy Review, March 1989.

7. EPA Journal, January/February 1989.

8. Based on WRI calculations using data from DOE's Monthly Energy Review.

9. New-car fuel efficiency data from MVMA Motor Vehicle Facts and Figures, 1988; gasoline price data from DOE's Annual Energy Review, 1988.

TRENDS IN U.S. OIL CONSUMPTION AND IMPORTS, 1982-1989



World Resources Institute, 9/89

FIGURE 1

TRENDS IN U.S. OIL PRODUCTION
In Millions of Barrels per Day)

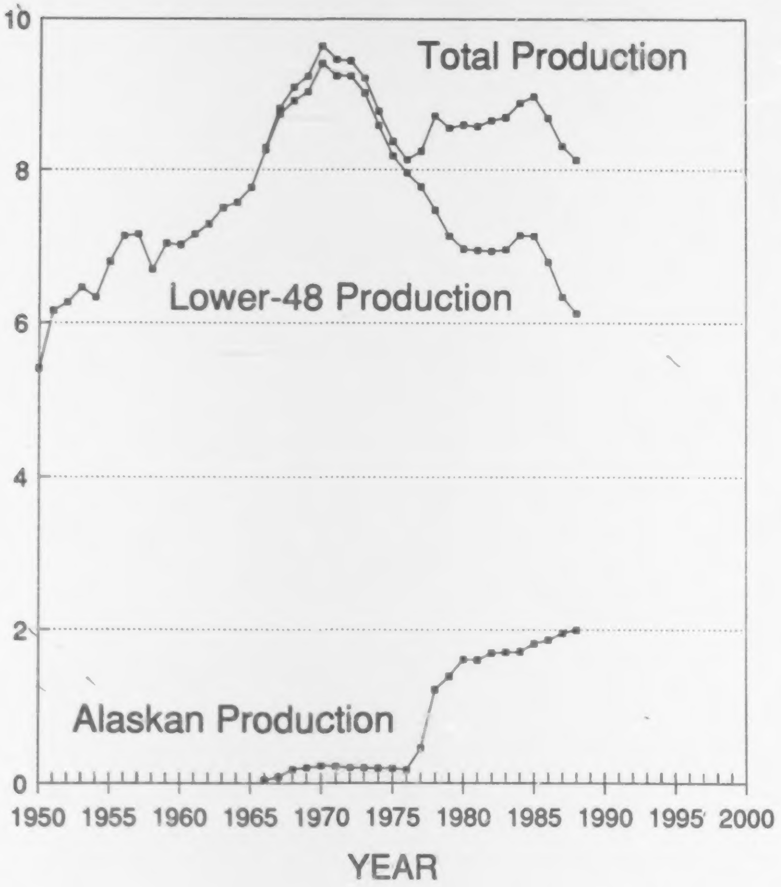


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FIGURE 2

TRENDS IN OIL DRILLING AND OIL RESERVES FROM 1968 TO 1987

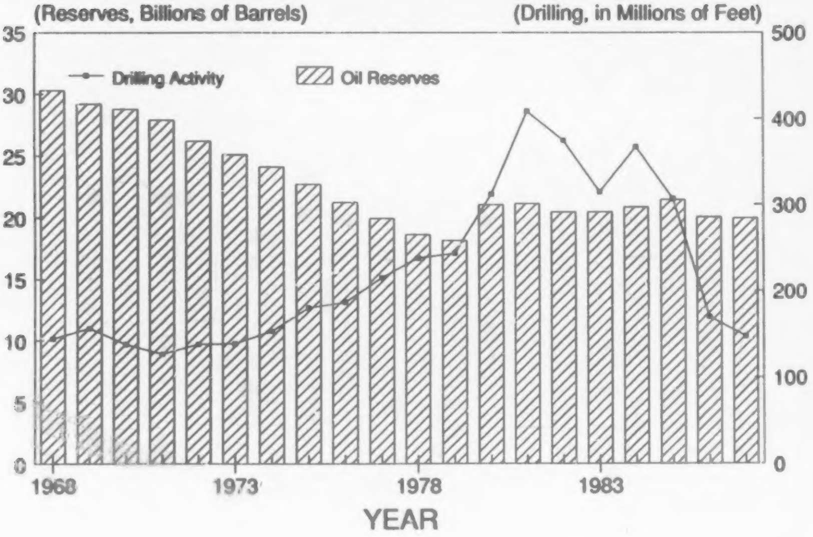

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FIGURE 3

SUCCESS RATE IN FINDING OIL IN THE LOWER 48 STATES

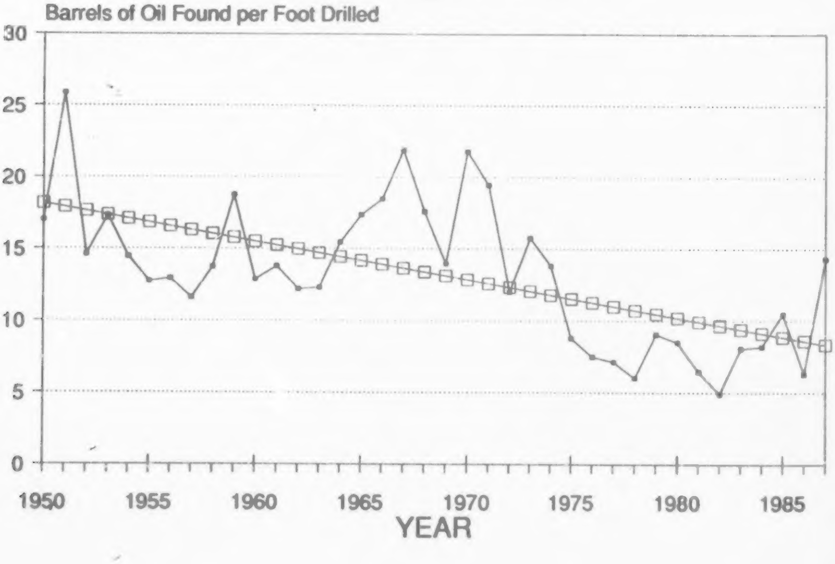

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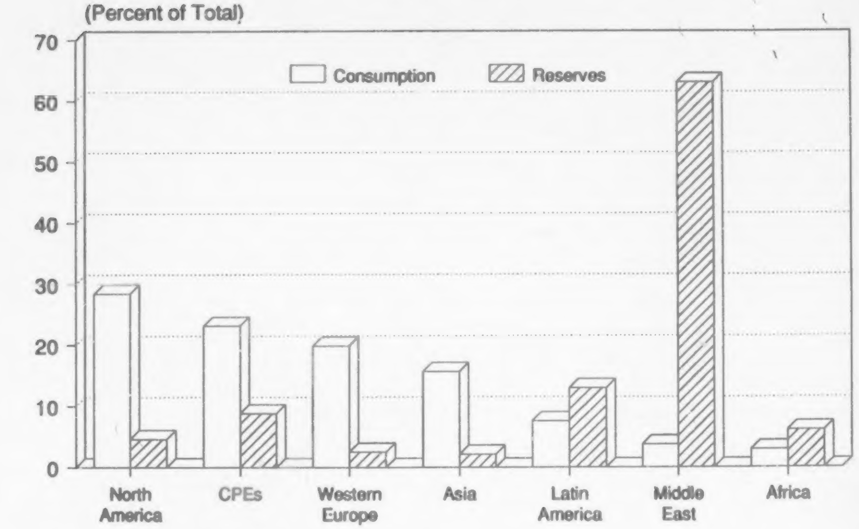
FIGURE 4

GLOBAL OIL CONSUMPTION AND RESERVES
(1987)



CPE = Centrally Planned Economies

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FIGURE 5

OIL CONSUMPTION IN THE UNITED STATES

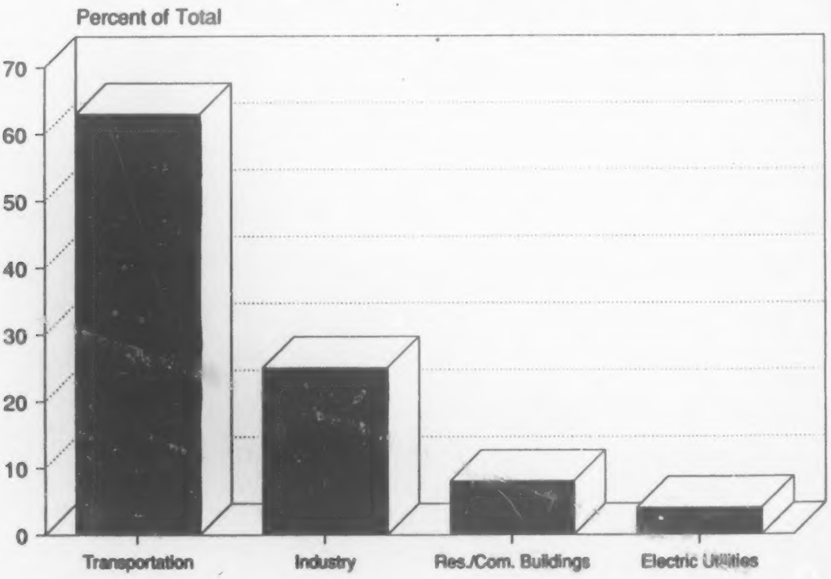

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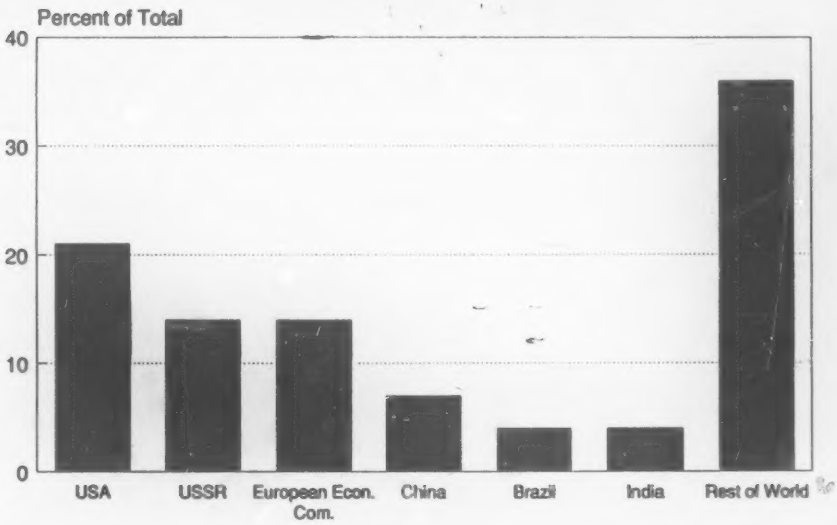
FIGURE 6

REGIONAL CONTRIBUTIONS TO THE GREENHOUSE EFFECT

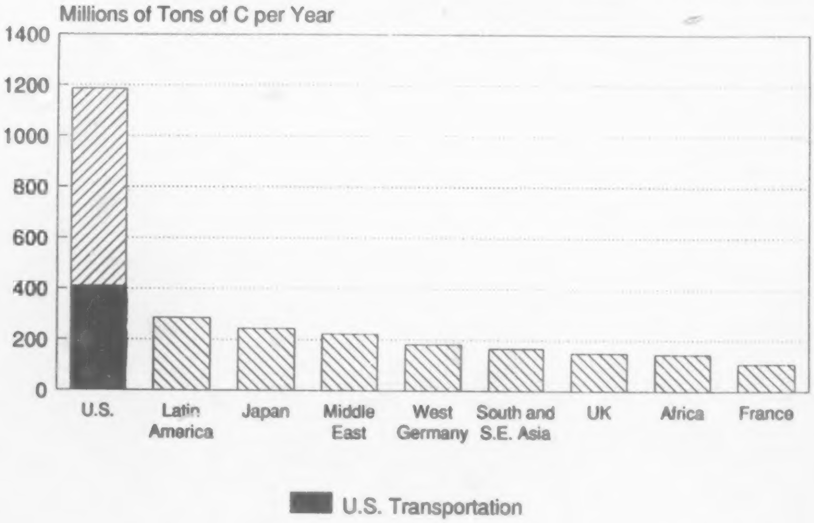


Source: EPA

World Resources Institute, 9/89

FIGURE 7

CO2 EMISSIONS FROM FOSSIL FUELS FOR SELECTED REGIONS (1985)



Source: World Resources Institute, DOE

World Resources Institute, 9/89

FIGURE 8

CO2 EMISSIONS FROM U.S. TRANSPORTATION ACTIVITIES

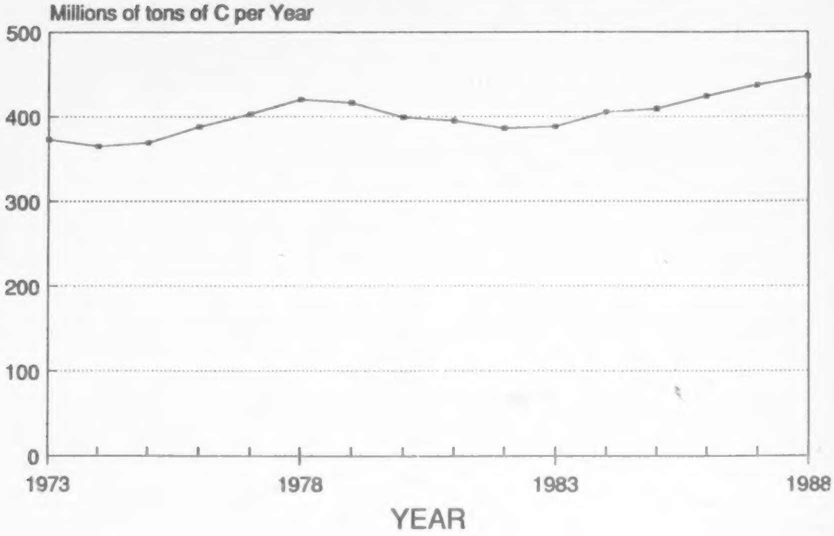


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FIGURE 9

TRENDS IN NEW-CAR FUEL EFFICIENCY AND GASOLINE PRICES

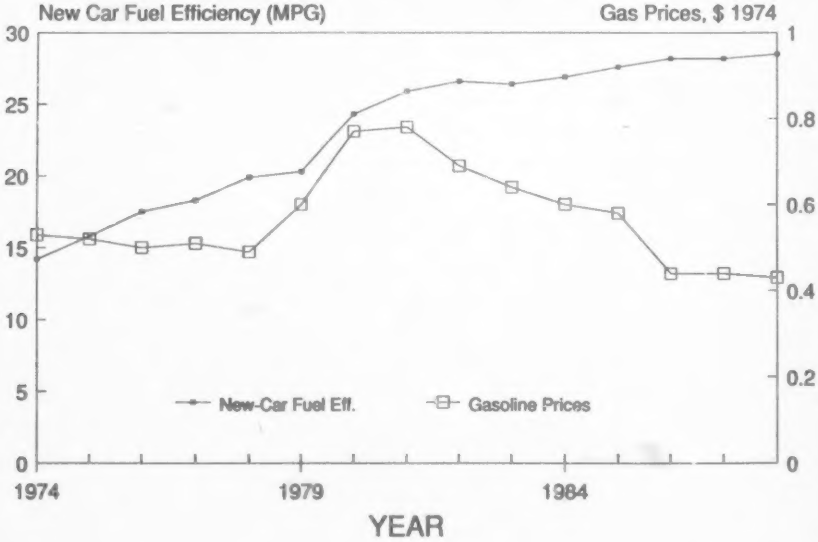

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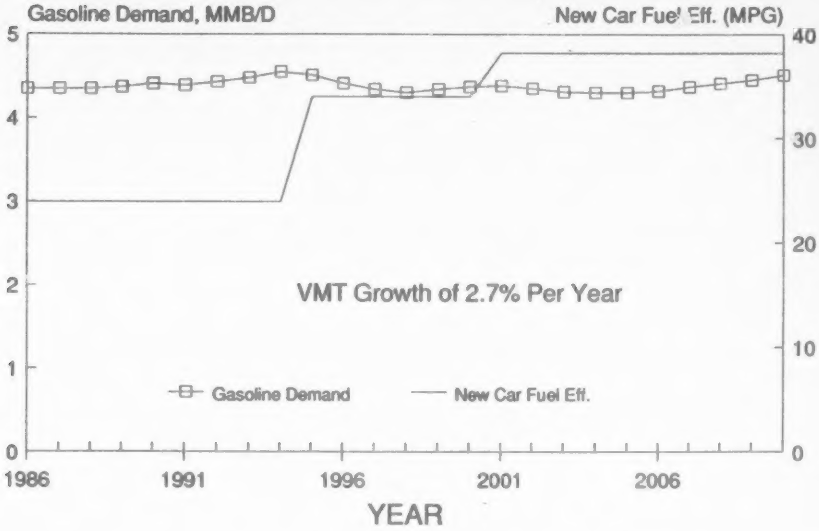
FIGURE 10

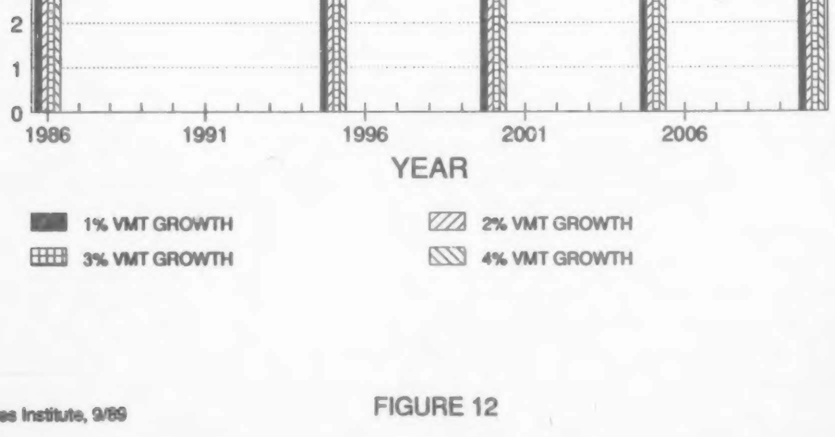
PASSENGER CAR GASOLINE USE UNDER CAFE REQUIREMENTS OF S. 1224



World Resources Institute, 9/89

FIGURE 11

GASOLINE USE UNDER CAFE REQUIREMENTS OF S. 1224 FOR VARYING VMT GROWTH RATES



World Resources Institute, 9/89

FIGURE 12

Senator **Bryan**. Thank you very much, Mr. MacKenzie.
Mr. Yeager.

STATEMENT OF BROOKS YEAGER, VICE PRESIDENT, GOVERNMENTAL AFFAIRS, NATIONAL AUDUBON SOCIETY

Mr. **Yeager**. Hello, Mr. Chairman and Senator Gorton. I would like to submit my testimony for the record, and I would just like to note also for the record that I am speaking on behalf not only of the National Audubon Society but of 18 other groups that are members of the Energy Conservation Coalition. I will not go through the whole list, but they include some of the largest environmental and consumer groups and some religious groups and scientific groups. So I think that makes an interesting list.

Senator **Bryan**. They will all be noted for the record, Mr. Yeager, and your full testimony will be included.

Mr. **Yeager**. First of all, I would like to applaud you and Senator Gorton as well as your other cosponsors for introducing the legislation. To echo the sentiment that you expressed in your introductory statement, it is vitally important to both the Nation's energy security and the environment to make progress in this key area.

The groups that I am representing today strongly support S. 1224. As we indicated to you in our meeting yesterday, however, and as I will explain, we believe the bill can and should be improved. In fact, we think that it should set a somewhat higher goal for efficiency gains and that it should also attempt to address the issue of truth in testing so that the numbers that we specify in our goals for auto fuel economy and light truck fuel economy in the United States do not deteriorate in terms of their representation of reality over time.

I would like to focus my time today on why we think auto fuel economy is so important, because you are going to hear a lot of testimony today about why it is going to be so difficult to make gains in auto fuel economy. I think it is important for you and for the Congress to consider why we absolutely must make gains in auto fuel economy.

First of all, it is our view that boosting U.S. auto efficiency is the most important single step we can take to increase American oil security. Dr. MacKenzie has outlined what is a gloomy picture for American oil security.

The only thing I would add to that is that we are in the classic position at this point of being a marginal producer. It is not that we are running out of hydrocarbons under the ground. It is that our hydrocarbons are more expensive to produce and harder to get at than the hydrocarbons that are available from the Middle East, Venezuela and other areas.

So when Senator Nickles noted that we were importing foreign oil and that is expensive, that is true in the aggregate. The reason, however, that we are importing foreign oil is it is cheap. It is cheaper than our oil, and that is not likely to change. The situation is going to get worse, if anything, as Dr. MacKenzie pointed out.

Our oil is going to continue to be remote, harder to find, existing in already-depleted reservoirs where it takes extraordinary techniques to get it out of the ground. Although we can do that at a high oil price, we are better off not doing it. We are better off continuing to keep world oil prices low for our economy, and the result is that we have to deal with the fact that our ability to leverage the world oil economy rests not with our ability to produce our way out of the mess that we are in but with our ability to restrain our consumption so that we can get out of the mess we are in.

The second point I would like to make is that boosting U.S. auto efficiency will ensure or will help us in our effort to save the most fragile and most beautiful of our coastal wilderness resources for our children and our grandchildren.

If we are willing to drill the oil field under Detroit, we can obviate the need to exploit wilderness insensitive coastal areas for their presumed oil resources. That is obviously very important to groups like the Audubon Society, the Sierra Club, the National Wildlife Federation and others who I am speaking for today.

I think you will hear in later testimony the difficulty, including the political difficulty, of making gains in auto fuel economy in the United States. As you are both aware, the tremendous sacrifice that we have to make if we do not make those gains will also, I think, involve political difficulties and will involve and can involve a tragedy in fact.

We have just experienced eight years under an administration whose primary philosophy in energy policy was to not guide the Nation, not attempt to make progress, not exert Federal leadership except to the extent that it was willing to essentially open up the Federal energy resource base as a kind of bargain basement and hope that that would solve our energy problem. It did not work. It has not solved our energy problem. It did create an enormous number of consuming political battles over saving resources that we believe ought by right to be saved for future generations of Americans.

A third point is that boosting U.S. auto efficiency is going to be necessary, although not sufficient to attain clean air standards in our Nation's urban areas. The transportation sector currently accounts for about 30 percent of U.S. hydrocarbon and nox emissions, which are the primary constituents which react photochemically to form smog.

Recent studies have shown that there is a clear correlation between increased automobile efficiency and lowered hydrocarbon and carbon monoxide emissions. That correlation may not be true with nox, but I think it is important to make the gains that we can in this area through gains in fuel economy.

Finally, we think that boosting U.S. auto efficiency is probably the single most important thing we can do to begin addressing the problem of global climate change, and I think you will hear later that it is only a small part of the problem.

That is true, but there are not any overwhelming parts of this problem and in fact even though the transportation sector is only a small part of the global warming problem it is probably the biggest small part that you can find that you, as senators in the United States Senate, can work on. So it is worth doing because of that.

It seems to me that we have to be careful about the claims that have been made and that will be made that we cannot make progress in this area.

The United Auto Workers has been a constructive force in fuel economy discussions over a long period of time, and they are in a tricky position, and I think I would like to say on the part of the environmental community that we are very sympathetic with the problem that they have with out-sourcing.

We think that there are ways to solve that and we think, in fact, that a fuel economy bill structured along the lines of yours can ultimately help with that problem. One way to do that might be to adopt a simple anti-backsliding provision that makes it clear, that makes it impossible for the manufacturers to solve momentary CAFE problems by shifting large cars into the foreign fleet.

I think that that would help both retain U.S. jobs, which is a goal that we would like to see accomplished, but it would also keep us on the road to greater fuel economy.

The only thing I would like to say in conclusion is that we believe that it is possible to attain higher fuel economy than is even made as a goal in your bill. We believe it is necessary.

We believe an appropriate figure for an overall goal that we would like to see at the turn of the century is 45 miles per gallon, which is not as high as the figure that Dr. MacKenzie mentioned as being necessary to achieve a 20 percent reduction but is something that we think can be achieved.

We think that it is appropriate to aim the auto industry at a goal that does require some technology forcing, but that does not require imaginary technologies to be brought into play in the next ten to 15 years.

We think you have to force the envelope. We think that—the auto industry told us in 1975 that we could not make the gains that we have made in the last ten years. They will tell you again that we cannot make the gains. We must make the gains.

[The statement follows:]

STATEMENT OF BROOKS B. YEAGER
VICE PRESIDENT FOR GOVERNMENT RELATIONS

ON BEHALF OF THE NATIONAL AUDUBON SOCIETY
AND THE ENERGY CONSERVATION COALITION

Dear Mr. Chairman, Members of the Subcommittee:

Thank you for the opportunity to present the views of the National Audubon Society on S.1224, "The Motor Vehicle Efficiency Act of 1989."

The National Audubon Society is one of the nation's oldest and largest conservation organizations, with more than one half million members and over 500 active chapters located throughout the United States and in several foreign countries. Audubon members and staff engage in a broad range of national and international conservation efforts, as well as scientific research and environmental policy studies on topics ranging from the protection of wetlands and other wildlife habitat to issues of national and international energy policy and its environmental consequences.

The Energy Conservation Coalition, consisting of nineteen environmental, consumer, religious, and scientific organizations, works to develop and foster energy efficiency policies at the national, state, and local levels. ECC member organizations include: the American Association of Retired Persons, the Citizen/Labor Energy Coalition, the Consumer Federation of America, Environmental Action, the Environmental Defense Fund, the Environmental Policy Institute, the Federation of American Scientists, the International Institute for Energy Conservation, the National Audubon Society, the National Consumer Law Center, the National Consumers League, the National Wildlife Federation, the Natural Resources Defense Council, Public Citizen, the Renew America Project, the Sierra Club, the Union of Concerned Scientists, the United Methodist Church - Board of Church and Society, and the United States Public Interest Research Group.

Mr. Chairman, we applaud you, and your cosponsors, Chairman Hollings, and Senators Gorton, Gore, and Lieberman, for taking the critical first step towards a new national effort to achieve significant gains in the fuel economy of the U.S. auto and light truck fleets. To echo the sentiment of your introductory statement on the bill, a serious gain in fuel economy is "vitally important to both the Nation's energy security and the environment."

It is for this reason that our groups strongly support S.1224. We believe, as I will explain in my testimony, that the bill can and should be strengthened -- in particular, by setting a higher goal for efficiency gains, and by introducing "Truth in Testing" to the measurement of fuel economy. With these additions, we believe S.1224 will mark a significant advance in the continuing debate over the future of the international energy economy, as well as that of the U.S. auto industry.

With your permission, Mr. Chairman, and since it is my understanding that other witnesses from the environmental and scientific communities will address the technical questions of the automobile industry's ability to meet the proposed standards, I would like to focus my attention on the larger context of fuel economy politics, and particularly on the relation between our success or failure in making gains in automotive fuel economy and achieving other notable social and environmental goals.

It is well to remember, that until Secretary Skinner's decision this April to uphold the 27.5 mpg. CAFE (Corporate Average Fuel Economy) standard currently mandated by statute, the reigning philosophy at the Transportation Department had been one of unmitigated opposition, not only to the CAFE program under the Energy Policy and Conservation Act (PL 94-163), but to any system of Federally-imposed standards for auto fuel efficiency at all. Former Transportation Secretary Burnley made clear on numerous occasions his distaste for the CAFE program, as well as his misunderstanding of its history and consequences. And, as is well known, he did everything possible within his discretion to relieve auto manufacturers of what he considered an undue burden.

Fortunately we now have a new political atmosphere, with a heightened awareness of the environment, in which both the Congress and the Administration are willing to consider constructive ideas for progress in national energy and transportation policies, and particularly in those areas where the two policy areas are inextricably linked.

Why do we consider automotive fuel economy so important? Because American progress, or lack of it, in this area, is at the very center of the most critical environmental debates of our time -- over American energy security; over the future of fragile coastal resources, and of unique wilderness habitats such as the Arctic National Wildlife Refuge; over the possibility of attaining healthful air quality in our major cities; over the very future of the world climate system.

I will summarize these points briefly and then discuss them in more detail.

* *Boosting U.S. auto efficiency is the most important single step we can take to increase American oil security.* The disturbing trend of increasing American dependence on remote, environmentally sensitive, and/or foreign sources of oil cannot be reversed without significant gains in the fuel economy of automobiles and light trucks. Such gains are within reach, and would have greatly beneficial impacts on the American oil dependency problem. According to a recent analysis, increasing U.S. new car fuel economy to 45 mpg. by the year 1998 would result in a savings of over 1.3 million barrels of oil per day in the year 2000, and 2.8 million barrels per day in 2010.[1]

* *Boosting U.S. auto efficiency will ensure that we can save the best, most fragile, and most beautiful of our coastal and wilderness resources for our children.* If we are willing to drill the "oilfield under Detroit," we can obviate the perceived need to exploit wilderness and sensitive coastal areas for their presumed oil resources. For example, achieving a 45 mpg. new car average by 1998 would effect a cumulative savings of over 20 billion barrels of oil by the year 2020 -- almost seven times the expected total production of the Arctic Coastal Plain. Even achieving a more modest 40 mpg. by the year 2000 would aggregate a total oil savings of almost 15 billion barrels in 2020 -- five times the Interior Department's hoped-for production from what is now the nation's premier wildlife refuge.[2]

* *Boosting U.S. auto efficiency is necessary if we are to attain clean air standards in our nation's urban areas.* The transportation sector currently accounts for almost 30% of all U.S. hydrocarbon and NOx emissions, the primary constituents which react photochemically to form smog. Recent studies

have shown a clear correlation between increased automobile efficiency and lowered hydrocarbon and carbon monoxide emissions.[3] Gains in efficiency are critical, not only to attaining healthful urban air, but to maintaining clean air standards under the pressure of projected steady increases in total vehicle miles travelled (VMT).

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[1] Watson.R, Oil and Conservation Resources Fact Sheet: A Least-Cost Planning Perspective, Natural Resources Defense Council, August 1988. The analysis assumes, for the "high mpg" case, a continuing improvement of fuel economy after 1998, reaching a high 60 mpg. for autos by the year 2010. Oil savings are calculated over a "market case", in which the savings predicted by DOE without further standard-setting are included.

[2] Watson, op.cit.

* *Boosting U.S. auto efficiency is probably the single most important thing we can do to begin addressing the problem of global climate change*. Increasing average U.S. automobile fuel economy to 45 mpg. over the next 10 years would cut total U.S. CO2 emissions by approximately 4% -- a critical step in any overall strategy to address the problem of global warming.

THE IMPORTANCE OF AUTOMOTIVE FUEL ECONOMY FOR AMERICAN ENERGY SECURITY

For most of the decade since the 1979 oil crisis, the Congress and successive Administrations have been engaged in a continuous, if fitful, discussion of how to shape a coherent national energy strategy designed to increase the energy security of the U.S. economy. For the most part, this discussion has focussed on the issues of oil policy and oil security.

Despite eight years of effort by the Reagan Administration to discourage Federal leadership towards energy efficiency, and instead to encourage increased domestic production of oil and gas, we have clearly failed to "produce our way" out of our dependence on foreign sources of petroleum. In fact, U.S. domestic production has declined, since 1985, by almost 1 million barrels per day -- primarily the result of shutting in marginally productive wells which are not price competitive against cheap foreign oil. At the same time, Americans' oil consumption, which had held relatively flat in the early years following the 1979 price shock, is once again growing at an annual rate of over 3%. Current U.S. consumption of over 15 million barrels of oil per day requires the annual importation of over 2 and 1/2 billion barrels of oil, and imports are projected to reach 50% of total U.S. demand by the early 1990's.

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[3] Cf. Calwell, Chris J., The Near Term Potential for Simultaneous Improvements in the Fuel Efficiency and Emissions of U.S. Automobiles, Master's Project, University of California, Berkeley, May 1989.

With the recent official downgrading of USGS's estimates of domestic undiscovered resources, policy makers may finally be ready to recognize that "producing our way out" is no longer a viable option.

Yet if we are becoming a marginal producer by world standards, we are certainly not a marginal consumer. As recent history shows, when we are willing to use our power as an oil consuming nation, and particularly when we are willing to act to restrain national oil demand, we can exert successful downward leverage on world oil prices. In effect, we won a decade-long struggle with OPEC. It has been estimated that between 1973 and 1983, the U.S. economy achieved gains in energy productivity that now save us over 13 million barrels of oil per day -- half the entire productive capacity of the OPEC nations. Auto efficiency gains were a major part of this -- between 1975 and 1985, the average fuel economy of the new car fleet improved from about 14 mpg. to about 27 mpg., with a resulting increase in the average fuel efficiency of all American cars and light trucks of almost 66%. This step by itself, which can largely be credited to the Congressionally mandated CAFE program, now saves us more than 2.4 million barrels of oil per day.

Although these savings are significant, there is more, so to speak, where they came from. The fuel efficiency oil field is one American reserve that is far from played out. Transportation now uses approximately 27% of modern global energy consumption. In the U.S., it accounts for almost two-thirds of total oil consumption. Oil use in the transportation sector alone now exceeds total domestic production.

Other witnesses today will testify in detail as to the auto industry's capability for making further gains. For my purposes, it is sufficient to note that DOE analysts have projected new car fuel efficiencies as high as 40 mpg. by the turn of the century, merely through the use of off-the-shelf technology. During EPA's state of the art review of technical options for dealing with global warming, analysts at the agency cited evidence showing the feasibility of efficiency levels as high as 50 - 70 mpg during the same time period. There are currently production models that get up to 55 mpg., and prototypes have been built to attain fuel economies in the 80 to 100 mpg. range.

Clearly, if gains on the order of those contemplated in S.1224 are available "off-the-shelf," we stand to gain even more by encouraging the development of automobile efficiency technology. And, if such gains are technically available to us as a society, the benefits of reaching for them far outweigh the costs.

THE IMPORTANCE OF AUTOMOTIVE FUEL ECONOMY FOR THE FUTURE OF OUR WILDERNESS AND COASTAL RESOURCES

In early May, I was invited to testify before the House Banking Committee on the subject of "Oil, the Environment, and Energy Security." In addition to representing the National Audubon Society at that time, I also spoke on behalf of the 55 member groups of the Alaska Coalition. The main point of that testimony, which I will be glad to submit for your consideration, was to explore the many options available to us for increasing American energy security, and to assess the consequences of not taking up these options.

From February, 1981 'till the beginning of this year, we in the conservation movement lived with an Administration that daily abdicated its responsibility to guide the nation in a rational energy strategy, in favor of a sort of bargain basement sale of Federal energy assets that Administration spokesmen claimed would solve the nation's energy dilemma.

It was trench warfare. And sometimes I fear we are not totally out of it yet. But what galled us most was not just the intellectual bankruptcy of the Administration's position -- it was the simple fact of the places that the Reagan team was prepared to sacrifice to continue America's oil addiction unabated. Georges Bank, the Florida Straits, Cape Mendocino; the Beartooth Ranger District, the South Fork of the Shoshone River, the Deep Creek and Palisades Further Planning Areas; Bristol Bay; and the Arctic National Wildlife Refuge, represent only the best known.

A simple list cannot do these places justice. They, and many other places, equally valuable or beautiful in their own way, represent a living heritage that we must hand down to our grandchildren, not squander for momentary gain.

Even collectively, these places would be little more than a drop in the bucket of our national oil needs. Certainly, they can contribute less in that respect than a serious effort to improve auto fuel economy, or any number of other available options for increasing the efficiency with which we use energy, or the development of renewable alternatives to fossil fuels. Yet they were all on the auction block, and many of them still are, because selling them off is considered to be politically easier than taking the other steps we know so well how to take.

I would suggest, Mr. Chairman, that the bill you have introduced with your colleagues represents a more serious, far-seeing, and truly conservative manner of beginning to meet our nation's resource needs than would the unnecessary sacrifice of the best and most fragile of our natural resource lands.

THE IMPORTANCE OF AUTOMOTIVE FUEL ECONOMY IN THE EFFORT TO AVERT DAMAGING GLOBAL CLIMATE CHANGE

There is a steadily growing body of evidence, and a strong consensus in the scientific community, that excess emissions of CO2 and other trace gasses to the atmosphere, primarily from anthropogenic sources, are committing the planet to an increase in global temperature unprecedented in human history. The National Academy of Sciences has projected the potential increase, during the period from 50 to 100 years from today, as ranging between 2.7 and 8.1 degrees Fahrenheit. This temperature change corresponds in scale to the change that characterizes the transition from a global ice age to an interglacial period. The difference is that the atmospheric warming we now face, and the corresponding effects on natural systems, would occur in 100 years, instead of 10,000.

The consequences of such global warming are currently much in debate. But on the likely list, many climate specialists include such impacts as a rise of several feet in global sea levels and the consequent loss of up to 80% our the world's coastal wetlands, a higher probability of drought and unacceptably high temperatures during growing season in the northern mid-continents, the failure of many plant forms, and of animal species dependent on them, that will be unable to "keep up" with the northern movement of their climatic niche, and so on.

The causes of global warming are multi-faceted, and include such phenomena as the introduction of chlorofluorcarbons to the atmosphere, tropical deforestation, and increases in methane emissions to the atmosphere from presently unknown sources.

However, it is estimated more than 50% of the overall problem is due to excess emissions of C02.

Clearly, reducing CO2 emissions, not just from projected levels, but in an absolute sense, is a necessity if we are to avert the worst consequences of global warming. This has been recognized internationally, including at the June, 1988 Toronto Conference on "The Changing Atmosphere," which concluded with a call for an initial goal of a 20% absolute reduction of world CO2 emissions by the year 2005.

The U.S. currently emits almost 25% of the world's excess atmospheric carbon, and, in the U.S., the transportation sector accounts for approximately 30% of the emissions total. Twenty per cent of America's CO2 emissions come directly out the tailpipes of cars and light trucks.

Without serious advances in auto efficiency, this problem is likely to grow worse. DOE and other analysts now estimate that total vehicle miles driven will grow from 2 to 3% annually between now and the year 2000. Without compensating increases in fuel economy, such an increase would not only undermine the effect of tighter emissions standards for hydrocarbons and other pollutants, but would produce a corresponding increase in CO2 emissions from the vehicle fleet.

THE NEED FOR IMPROVEMENTS IN S.1224: AIM TO FORCE THE TECHNOLOGY, AND 'TRUTH IN TESTING'

As I stated earlier, both the National Audubon Society and the Energy Conservation Coalition believe that S.1224 can and should be strengthened with the addition of amendments which would set a higher basic goal for efficiency gains, and require a more accurate testing procedure for measuring vehicle fuel economy performance.

We realize that the 40% efficiency gain required of manufacturers in the bill, which equates to an overall efficiency of approximately 40 mpg. for new cars and 30 mpg. for new light trucks at the turn of the century, was set in at least partial response to analytical advice that such gains could be achieved with the implementation of "off-the-shelf" technology, and without forcing any alteration in the current mix of size classes produced by the major auto manufacturers.

There are certain obvious advantages to this approach. It is a significant gain over present levels, it's highly defensible, and it does not require basic technical improvements in order to succeed. On the other hand, the simple scale of the problems which we face, and which we must address, at least partially, through improvements in the automobile sector, argues for a higher standard -- one that does, in fact, force the technology into the 21st Century.

We believe that by requiring a 65% increase in average fuel economy for each manufacturer, or approximately 45 mpg. overall for new cars and 35 mpg. for new light trucks by the year 2000, the Federal government could play an even more constructive role in encouraging the development and full commercialization of efficient materials and technologies, including greater use of plastics and composites, the development and refinement of continuously-variable transmissions, and the refinement and introduction of two-stroke engine designs.

At the same time, we think it is important that the first major reauthorization and revision of the law by which Congress requires gains in auto fuel economy recognize the real changes in driving habits which are rendering the current procedures for measuring fuel economy more and more misleading.

DOE currently assumes that EPA fuel economy test results overestimate actual on-road fuel economy by as much as 15% -- and that this testing gap will grow to almost 30% by the year 2010. This is the result, not only of built-in deficiencies in the test, but also of changing driving patterns, increasing congestion in metropolitan areas, and even of simple demographics (more and more Americans live in congested areas). When the average highway speed in metropolitan areas like Los Angeles and New York is close to 30 mph., a test that assumes optimal driving conditions becomes more and more irrelevant.

Finally, we think that the Congress should ensure that its efforts to encourage a new effort towards auto and light truck fuel economy are not undermined by the abuse of the CAFE incentive currently available to manufacturers of vehicles designed to run on either standard gasoline or methanol fuels ("flexible fuel" vehicles). This incentive, which Congress made available under the Alternative Motor Fuels Act of 1988, was designed to encourage industry development of an alternative fuels infrastructure. However, if the requirement of the development of dedicated alternative fuel vehicles contained in the President's Clean Air proposal is enacted, the presence of a CAFE incentive would be superfluous, and the application of such an incentive to the dedicated alternative fuel vehicle fleet would substantially weaken Congressional efforts to achieve greater fuel economy in the overall automobile and light truck market.

CONCLUSION

Continuing the improvement in American automobile and light truck fuel economy started under the CAFE program is essential to a number of the United States' most critical environmental goals, including increasing American energy security, preserving fragile coastal and wilderness environments, attaining healthful air quality for city dwellers, and averting the worst ravages associated with global climate change.

S.1224 represents a significant step forward in addressing this need, but it should be strengthened to set a modestly higher goal for fuel economy gains in the coming decade, and by requiring "truth in testing" for fuel economy.

Senator BRYAN. Thank you very much, Mr. Yeager. Ms. Bleviss?

STATEMENT OF DEBORAH LYNN BLEVISS, EXECUTIVE DIRECTOR, INTERNATIONAL INSTITUTE FOR ENERGY CONSERVATION

Ms. BLEVISS. Thank you very much.

Thank you, Senators, for inviting me to testify again before your Committee, and I would like to take this opportunity to compliment you on the initiative that you have taken since the last time I testified.

I would specifically like to compliment you on your diligence in moving forward with this bill and its various provisions, many of which encompass the points that I made in my previous testimony.

If I may, I would like to move forward and make a few additional suggestions on how you might further improve the bill, many of which pick up on comments made by my colleagues.

The first and most important point I would like to make is the need for higher levels of fuel economy than are even proposed in your bill. If I may, I would like to place this issue in a historical context as well as address it for the future.

In 1979—which is about when I started working on fuel economy issues—a report was released done by the Solar Energy Research Institute, that both called for and certified the feasibility of achieving 60 miles per gallon in new cars by the year 1995.

OTA and DOE at that time were certifying the feasibility of achieving 45 miles per gallon in new cars by 1995. Since that time, however, we have had a few intervening years in which we have seen a backsliding in achievements in national new car fuel economy. And now you are hearing today a lot of people who are questioning whether or not we can even reach 40 mpg for new cars by the end of this century.

It is important to remember this historical perspective as you confront today's nay-sayers here. We must address future fuel economy requirements from the perspective that we are seeking to solve some critical problems that are coming down the pike. And the issue is, are we going to try to solve them with an aggressive but doable tactic today, or are we going to make marginal improvements today and wait until the mid-1990s and the middle of massive panic?

In the latter case we may have to turn to much more directly draconian measures. We may, at that point—I am not predicting we will, but we may—at that point actually have to talk about rationing driving by Americans or rationing gasoline purchase. Et cetera, et cetera. Do we want to wait until that day and chance that we will have to turn to much more upsetting strategies and policies in this country? I think not.

Now, let me turn to the issue of where we should be going. I support the proposal made by Mr. Yeager that we seek to establish by the end of this century fuel economy levels of about 45 miles per gallon for cars and 35 miles per gallon for light trucks. That is an aggressive goal. It is not an undoable goal, especially, again, considering where projections were going ten years ago.

Just to consider some of the issues: clearly, we have a problem today. The problem is low oil prices. It has sent a major message to both consumers and the auto manufacturers alike that fuel economy is not important.

No one is faulting anybody for acting upon that message. That message has led manufacturers to follow a course of action that is not really going to substantially improve their overall fuel economy in the next decade.

However, we do know that manufacturers were thinking about fuel economy as recently as the early 1980s, and just to give you an example of their thinking at that time, please note that in the not-too-distant future, hopefully in the next year or two, we will see the Saturn come out—roll off the assembly line.

When the Saturn was first developed—when the prototype was first developed—it was developed by the advanced engineering group at General Motors, which was given marching orders not to use exotic technology, but just optimize what they already had.

The prototype that came out—and was heavily photographed—looked very similar to today's cars. It had a 4-speed automatic transmission and a 5-speed manual. It had a very conventional engine, although I believe it used an aluminum block. Yet interestingly enough, it achieved 45 miles per gallon in the city and 60 miles per gallon on the highway.

Now, that is not the car we are going to see roll off the assembly line, because we have had an intervening eight years of messages saying fuel economy is no longer important. But I think it is illustrative of the fact that we are not at the margin in terms of what we can achieve in fuel economy, and I know that the panel that will follow us is probably going to argue very much the other way.

I also would like to argue that it is very important to realize that studies such as the OTA study—which was used heavily in the development of this bill—and the DOE study, are important tracking devices, but they really should not ever assume the role of the tail wagging the dog in designing fuel economy legislation.

To give you a good illustration of the limitations of these studies, the OTA and DOE studies both tried to come up with levels of cost-effective technologies to be introduced in the next decade. I undertook a study between 1985 and 1987 looking at future fuel economy technologies and I can tell you honestly that one of the most frustrating things to try to get hold of is an estimate of the cost of these technologies.

Those who have the best estimate are the automobile companies, but the problem, of course, is that they do not want to offer that estimate for a wide variety of reasons—competitive reasons, as well as fears that such information might lead to an additional regulatory burden being placed on them.

Thus, it is in the interests of the auto companies to elevate the estimated costs of those technologies, especially when there is a tremendous uncertainty associated with the technologies because their introduction will not come until well into the future. Also, when these companies talk about the costs of those technologies, they are going to talk about them at the point of introduction, not once they have gone into the fleet on a wide level, at which point there are economies of scale that are enjoyed by those technologies, which will bring the costs down.

Again, what you have to watch out for, then, is when you look at these studies, they are important guideposts but they really should not be used to set the law, the way some people are proposing they be used today.

Let me just move on quickly to a couple of other points, besides the need for higher fuel economy requirements. There was a comment made earlier by Mr. Yeager about the need to improve the fuel economy test.

There has been a problem with this test for many years. This problem is expected to grow such that by the end of the century we could be seeing a 30 percent difference between what is actually measured on the road when you drive your car and what the test says you are delivering, and it is 30 percent the wrong way.

Another suggestion for strengthening the bill is that embodied in it should be a strategy for what we do the next time around. We have had five years now between when the 1975 law effectively ended and the present debate about what we are supposed to do for the next ten years. In doing so, we have lost five very valuable years.

The need to reduce CO_2 emissions is not going to end at the end of the century, and we really need to embody in our legislative process a mechanism for beginning to address the post-2000 period now. We certainly do not know at this time what those fuel efficient technologies will be for the post-2000 era. But we do know we need to have a mechanism built in to the law to begin to address what we do in the post-2000 era before we reach the end of the century.

Finally, I would just like to say that the regulatory approach will not work in and of itself. There have been comments made today that I am in complete agreement with. We need to send the right signals to consumers. Consumers are not buying fuel-efficient cars. We cannot lay the blame at the automobile manufacturers totally. We have to send the message to consumers and that has to be addressed in any comprehensive fuel economy legislation.

I also would like to pick up the R&D aspect. We are, compared to our competitors overseas, lagging in fuel economy research, and there is a need to address this lag as well.

Thank you very much.

[The statement follows:]

STATEMENT OF DEBORAH LYNN BLEVISS, EXECUTIVE DIRECTOR, INTERNATIONAL INSTITUTE FOR ENERGY CONSERVATION

Mr. Chairman, and Members of the Subcommittee. Thank you for the opportunity to testify before you today with regard to S. 1224. It was only a few short months ago that I testified before your subcommittee on the need to enact new legislation to improve the fuel economy of the new light vehicles (automobiles and light trucks) that will be sold in this country over the next ten years. Hence, it is with great pleasure that I have now been asked to comment on S. 1224, which seeks to do precisely that.

As I mentioned to you in my previous testimony, I appear before you with the experience of having conducted a study between 1985 and 1987 that looked at: the light vehicle fuel economy technologies now under development throughout the industrialized world, the progress being made in bringing those technologies to market, the reasons for the differential rates of progress, and the policies required to expedite the introduction of those technologies. That study was published last year as a book entitled, "The New Oil Crisis and Fuel Economy Technologies: Preparing the Light Transportation Industry for the 1990s." A major conclusion of that book was that the domestic automotive industry trails its competitors in developing the fuel efficient technologies for light vehicles that will be needed in the next decade; new fuel economy standards were among the mix of policy recommendations given to address this problem.

The Need for Improved Fuel Economy

Improved light vehicle fuel economy is needed in the U.S. for both energy security and global warming reasons. Following years of stability, energy use in the United States is growing once again. And leading the way has been the transportation sector. After declining steadily following the 1979 oil crisis, oil use for transportation set a new consumption record in 1986 and has been growing steadily at a rate of 2.0 to 3.5 percent annually ever since.

Since two-thirds of the oil use in the U.S. is for transportation, renewed growth in this sector both increases American dependence on imported oil and places upward pressure on the worldwide petroleum market, both resulting in a growing risk of a future oil price shock and possibly an oil supply disruption. The rate at which American dependence on imported oil has grown has been alarming. In 1985, oil imports accounted for only 32 percent of all oil use in this country. In contrast, two months ago, in July, imports exceeded 50 percent. Experts now expect either 1990 or 1991 to see imports over the entire year climb over the fifty percent mark.

Improving the fuel economy of light vehicles clearly can do much to control--and potentially lessen--this import dependence. Indeed, the improved fuel economy of light vehicles realized between 1975 and 1985 contributed heavily to the reduction in our oil import dependence that was achieved during those years. Moreover, these efficiency improvements had a significant impact as well on global oil demand; between 1979 and 1983, fuel economy improvements in the American new car and light truck fleet accounted for fully 20 percent of the total oil savings achieved by the industrialized country members of the International Energy Agency.[1]

Another critical reason to pursue improved levels of light vehicle fuel economy is to lower the global warming risk. The major greenhouse gas contributed by motor vehicles is carbon dioxide (CO_2). A single tank of gasoline in a typical light vehicle produces between 250 and 400 pounds of CO_2 when burned. In 1985, motor vehicles accounted for almost one-quarter of the CO_2 emitted in the U.S.[2]

Clearly an important strategy in holding the line on carbon dioxide output from the transportation sector must be improving the fuel economy of motor vehicles, over half of which are light vehicles. Doubling the fuel economy halves the CO_2 output of a vehicle. Improving fuel economy looms as an ever more important strategy when one recognizes that the number of vehicles on the road in both the U.S. and the world will not remain constant. In fact, vehicle miles traveled has tended to grow at an average rate of 2.7 percent per year in this country. Higher fuel economy is required to counterbalance the increase in carbon dioxide emissions that will result from the increasing road travel in the years ahead.

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[1] Testimony by Dr. Robert H. Williams, Center for Energy and Environmental Studies, Princeton University, at the Hearing on Automobile and Light Truck Fuel Economy of the Subcommittee on Energy Conservation and Power of the U.S. House of Representatives, July 31, 1984.

[2] DeLuchi, M.A., Johnston, R.A., and Sperling, D., "Transportation Fuels and the Greenhouse Effect", University-wide Energy Research Group, University of California, UER-182, December 1987.

Comments on S. 1224

The need to improve light vehicle fuel economy is therefore clear. And S. 1224 is an important step in addressing this need. I would like to compliment both the senators and their staffs on their diligence and commitment in bringing this bill forward.

The bill addresses many of the points I recommended in my previous testimony. It adopts the percentage approach, thereby equalizing the technology push on full-line and small car producers. Nevertheless, it places a ceiling on how high the average fuel economy improvement of any single manufacturer must be, thereby protecting any manufacturer that already enjoys a high average fuel economy in the vehicles offered for sale today from being pushed up against a technological limit.

Furthermore, the bill legislates percentage standards for light trucks as well, taking authority for standard-setting away from the Department of Transportation, which has too frequently been influenced by the industry to weaken the standards it proposes. This change is critical because light trucks are an ever growing portion of light vehicle sales, presently accounting for a third of such sales. Moreover, since these trucks are less efficient than cars and their lifetimes are longer, they account for a disproportionate share--fifty percent--of the oil consumed over the lifetime of light vehicles.[3]

Finally, the bill changes the annual improvement requirement, spacing the milestones by which the manufacturers must improve their fleet fuel economies. This makes more sense and is less onerous to automotive companies because fleets do not change very rapidly in their average fuel economy from one year to the next.

It should be noted, however, that spacing the milestones as far apart as every five years means Congress will be placing considerable faith in the industry that it will be diligent in meeting the standards. Recognizing the game-playing by the industry with fuel economy regulations that has characterized recent years, such faith may be misplaced. The federal government will basically get only one chance to measure how well the industry is pursuing its fuel economy requirements. I realize that the proposal in the bill to double fines if the industry misses its fuel economy requirements two years in a row seeks to deal with this problem. An alternative method might be to establish three milestones rather than two, each spaced three to four years apart.

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[3] Department of Energy, Periodic Energy Report, Number 2, December 1987.

Suggested Improvements to S. 1224

A. More Aggressive Standard

The 1995 and 2000 percentage improvement requirements set forth in this bill are based upon models developed by the Department of Energy and the Office of Technology Assessment. I have the greatest respect for the work done by these agencies. (Although I am concerned that progressive iterations of these models have resulted in a downward ratcheting of projected levels of cost effective fuel economy levels, seemingly in the face of political pressure.) Such models are important guides for evaluating what industry can do under similar market conditions as today and assuming future product plans remain static. But they should not assume such a role of importance that the "tail starts wagging the dog". Consider the following points:

1. The automotive industry rarely makes a decision to introduce a technology based upon its rate of return in fuel savings.

Rather, manufacturers look at a wide range of factors including: the multiplicity of benefits that result from that technology (e.g. dent resistance of plastic body panels), product plans of competitors, consumer interest in the product, the risks associated with failure of the technology, regulatory requirements, and first costs of the product. In fact, the strategy of American policymakers to try to determine the cost effectiveness of various fuel economy levels drew puzzlement from most foreign automakers when I described the process to them as part of the study I referred to earlier; they had NEVER made such calculations. It is indeed telling that during the time I conducted the study, interest in improved fuel economy on the part of both policymakers and automobile companies was at an all-time low. Yet they were still pursuing fuel economy technologies. Why? Because they saw other benefits from introducing those technologies. They might beat out a competitor and gain market shares. They could enhance their image with car buyers of being on the cutting edge of technology. The technology offered greater durability or comfort or easier maintenance. Hence, the exercise conducted by DOE and OTA does not model very well how automakers make their decisions about which products to introduce.

2. Costs for new technologies not yet ready for production are very inexact.

I found in my study that cost estimates tended to vary 200 to 300 percent, and in some cases as much as 1000 percent. In particular, the best sources for the estimated future cost of a technology is the automotive industry itself. But it is not in the interest of the industry to give a lower figure for the cost, for fear that it will make higher fuel economy standards seem more feasible. Hence, the figures provided tend to be on the high side. (On the other hand, cost figures from individual inventors tend to be on the low side.) Furthermore, once a technology is introduced and becomes widely used, its costs tend to drop as economies of scale are reached and competitors vie for market share. Hence, it is important to realize the tenuousness of estimated costs made by DOE and OTA, particularly for technologies that are several years away from commercialization.

Even considering the uncertainty associated with DOE and OTA cost numbers--and the likelihood that these estimates are on the high side--it is important to compare these costs with those of a typical car today. Figures put forward in a forthcoming article by DOE researchers estimate that the costs per car in going from a standard of 27.5 miles per gallons (mpg) to an effective standard of 39.4 mpg (roughly what would be achieved in S. 1224) by the year 2000 amount to $757 (in 1986 dollars).[4] This is comparable to the cost of merely adding an air conditioning option to a car. Moreover, considering that the average price of 1988 model year cars was almost $15,000, this increase amounts to less than 5 percent of the cost of the car-not a particularly onerous burden on consumers.[5] In fact, this additional cost is within the realm of sales incentives offered by manufacturers to move their car models.

This point is important because many have argued that new fuel economy regulations will make new cars unbearably expensive. Indeed, it is instructive to note that recent analysis shows that the safety, emissions, and fuel economy regulatory requirements of recent years cannot be blamed for the run-up of new car prices. Analysis completed by the U.S. Bureau of Labor Statistics shows that if the costs of a comparable 1967 car were inflated to current dollars and the value of safety, emissions, and fuel economy requirements were added, the resulting vehicle would cost $9880 in 1988.[6] Clearly other factors have led to price increases.

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[4] From a paper titled "Cost Effectiveness of Future Fuel Economy Improvements" to be published in Energy Journal.

[5] Based upon figures from the Department of Commerce, Bureau of Economic Affairs.

[6] MVMA Motor Vehicle Facts and Figures '89, p. 40.

3. The fuel costs used in the models make no attempt to quantify the externalities represented by increased dependence on imported oil and an enhanced peril of global warming.

Yet, these fuel economy regulations are being proposed precisely because these threats are looming. If these threats were not there, there would be no reason to propose fuel economy regulations. Hence, if levels of fuel economy are going to be set based upon a cost-effectiveness criterion, the price of fuel used should include the value of these externalities.

4. The "Product Plan" approach used in the DOE and OTA models does not model very well how a technology push strategy could drive fuel economy.

The DOE and OTA model approach assumes moderate changes in technologies without really changing product plans. But the purpose of fuel economy regulation should be a technology push, not only to significantly affect import dependence and the threat of global warming, but also to yield a competitive advantage. As I noted in my earlier testimony, the domestic industry lags in competitors in fuel economy R&D, much as it did in the mid-1970s when the first fuel economy regulations were passed. That first set of regulations provided a shot in the arm for the domestic industry, enabling it to better compete. But that first set of regulations did not accomplish this by marginally causing the industry to alter its product plans. A major re-evaluation of what was to be introduced in future years was undertaken.

A new set of regulations should have the same effect. If the changes will be marginal, with little benefit to oil import dependence, reducing the risk of global warming, or competitiveness, then there is little need for the regulations. We do not want manufacturers to shift their new product offerings to small, cramped cars with no acceleration, but neither do we want manufacturers to marginally tinker with current product plans. Prophesies of doom were offered with the first set of fuel economy requirements--a fear that everyone would be driving Pintos was cited. But these did not come to fruition. Instead the standard provided a technological challenge to automakers to offer consumers what they wanted but at greater levels of fuel economy.

The points just made highlight what a good fuel economy regulation law should do. It should provide a technology push on the industry. It should realize substantial benefits to the existing threats to our energy security and the security of the globe's climate. Yet, it should not set such aggressive levels as to divert capital within the domestic automotive industry away from such other important arenas to maintain its competitiveness as manufacturing technology, other technology development and new model development. In my previous testimony to you, I proposed a fuel economy standard that would seek to establish in ten years a new car fleet average of 45 mpg and a new light truck fleet average of 35 mpg as the course that would best meet all of these criteria. I continue to support these levels and recommend they be embraced in an amended S. 1224.

B. Better Fuel Economy Test

S. 1224 directs the Administrator of the Environmental Protection Agency to conduct a study on the accuracy of fuel economy testing. However, it places no requirement on the EPA that it take any corrective action to improve the accuracy of fuel economy testing. This is extremely important.

It has long been recognized that the current test used overestimates on-road fuel economy by 15 to 20 percent. The test procedure used, which is embodied in law, is old and outdated. In fact, consumers complained so bitterly about the fuel economy "shortfall" that EPA developed an arithmetic correction to the test that reduced measured urban fuel economy by 10 percent and measured highway fuel economy by 22 percent. This correction was applied to the Gas Mileage Guide and the labels that are required to be displayed on all new car models. But it was not applied to the fuel economy levels used to calculate compliance with fuel economy standards. Hence, for the purpose of policymaking, we are overestimating the impact of existing fuel economy laws.

Furthermore, in the years ahead, even the present arithmetic calculations will not model very well actual on-road fuel economy. There are three reasons for this. First, congestion in cities has reduced the average speed in urban driving conditions and increased the frequency of stop-and-go driving. This decreases the fuel efficiency of the average vehicle in urban driving conditions. Second, highway speeds have increased. Maximum speed limits on major highways have risen from 55 miles per hour to 65 miles per hour, and many drivers go faster still. The higher the highway speed, the lower the fuel efficiency of the vehicle. Hence, highway fuel economy is also being overestimated. Finally, composite fuel economy has historically been based upon a formula of 45 percent highway fuel economy and 55 percent urban fuel economy. But this proportion is also changing; the fraction of time spent driving in the urban mode has increased relative to the highway mode.

These changing conditions have led to speculation that by the beginning of the next century, the discrepancy between tested fuel economy and on-road fuel economy could be as much as 30 percent. Clearly, S. 1224 needs to be amended to direct the EPA after its study is completed to revise its test procedures to reflect today's driving conditions. This is an issue of truth in advertising. Furthermore, discretion needs to be provided to the Secretary of Transportation to revise fuel economy requirements over some reasonable period of time to account for the impact these revisions will have on measured fleet fuel economy. Furthermore, S. 1224 should direct EPA to review and adapt its testing procedure on a regular basis so that we are no longer hindered by an outdated procedure. I would suggest this process occur every seven to ten years. This would enable the test to be kept fairly well updated without placing an unduly onerous burden on the industry.

C. Rulemaking for Future Fuel Economy Regulations

At this point in time, we know that further improvements in light vehicle fuel economy will be needed after the turn of the century. Barring any major breakthroughs in developing a non-CO_2-producing vehicle fuel, we will need to continue to improve the fuel economy of our light vehicle fleet in order to control the threat of global warming. Furthermore, we will undoubtedly need to pursue fuel economy for energy security reasons as well.

However, at this time, it is almost impossible to assess what levels of fuel economy will be feasible in the new century. Nevertheless, we cannot afford the "down" time that would inevitably follow the termination of the proposed new set of regulations, especially if public attention at that time is turned to other issues. The example of the last five years is very telling. Public interest and attention was addressed elsewhere. As a result, fuel economy regulatory requirements were rolled backwards. And five years of benefits in terms of improving energy security and reducing the threat to global warming were lost.

S. 1224 needs to avoid the problems of the previous fuel economy law and provide for a process of continuity beyond the year 2000. The proposed bill has already made an important step in this direction by directing the National Academy of Sciences to assess every five years the state of development of fuel efficient technologies for light vehicles. This was a recommendation I had made in my study. But an additional element is needed that will translate the Academy's analysis into implementation. I would suggest that the Department of Transportation be required to provide for a rulemaking procedure following receipt of the Academy's 1995 report to set standards for ten years hence. A similar requirement should be established for the year 2000.

D. Supplementary Fuel Economy Policies

Fuel economy regulations are a necessary component of any successful program to improve the efficiency of the nation's cars and light trucks. But they are not sufficient in and of themselves to address this task. They need to be supplemented by consumer incentive programs so that the market works with the manufacturers in meeting the standards. And they need to be supplemented by research programs to ensure that the necessary technologies get to market.

I realize that these programs are out of the purview of this Committee. Nevertheless I would like to briefly address them because they are necessary parts of an overall package that only in its entirety can accomplish the goals this Committee has established.

In devising consumer incentives, clearly fuel prices have to be addressed. At present, they are quite low, thereby giving consumers the wrong message about the importance of fuel economy. However, it is important to recognize that increasing the price of fuel will do more to discourage the purchase of inefficient vehicles than it will do to push the purchase of higher fuel efficiency vehicles. This is because as the efficiency of a car increases, the fraction of its operating costs attributable to fuel costs drops. Fuel savings are still being realized--which clearly benefits the country--but in smaller increments. Hence, the incentive to invest in more efficient cars diminishes.

Trading in the 10 mpg car of a decade ago for one that got 20 mpg effectively doubled the range of the car, an effect every car owner recognized. But trading in a 30 mpg car of today for a 40 mpg car of tomorrow only increases the car's range by one-third, a much less noticeable effect. Evidence of this "diminishing return" can be seen in both Europe and Japan where fuel prices are roughly double what is seen in the U.S. Yet, the fuel economy of new light vehicles is not significantly higher than in the U.S.

This discussion is put forward to point out the limitations of a policy espoused by some to promote fuel economy by relying solely on increased fuel prices. There are numerous good policy reasons to consider increasing fuel prices, such as discouraging the purchase of gas guzzlers and reducing unnecessary driving. But higher fuel prices, particularly considering the limited increases that would be dictated by political realities, are likely to do little in pushing higher fuel economy.

A better vehicle to encourage consumers to purchase fuel efficient cars is through a vehicle tax and rebate scheme where the revenues from the tax--which would be assessed on gas "guzzlers"--would pay for the rebate--to be provided for gas "sippers". A gas guzzler tax presently exists in the U.S. but it has become outdated. A gas sipper rebate does not exist but was originally proposed by the Carter Administration. The state of Massachusetts is presently considering a variant of this scheme in assessing the sales tax on new light vehicles.

Finally, with regard to research and development needs, let me underscore the finding in the study I conducted that the domestic industry lags its competition in the breadth and scope of its fuel economy research. This lag needs to be remedied.

Conclusion

I would like to conclude by complimenting the co-sponsors of S. 1224 on their insight and vision in developing the bill. Hopefully, as the bill progresses through the Senate it will be strengthened with the suggestions I have made.

Senator BRYAN. Thank you very much, Miss Bleviss. Dr. MacKenzie, I believe you testified that by the year 2005, is it, we would have to achieve fuel efficiency of 55 miles per gallon to achieve a 20-percent reduction in CO_2. Do I have that correct?

Dr. MACKENZIE. That is correct.

Senator BRYAN. Tell us, based upon your own analysis, what you believe the technical capability is of the auto industry. What level ought we to include by the year 2000, or by the year 1995, so that we can make an apples to apples comparison for purposes of this legislation, which as you know has a 20 percent 1995 and a 40 percent 2001 year objective?

Dr. MACKENZIE. Senator, first of all that was on the road, and as Ms. Bleviss indicated the EPA standard would be 65 or higher. I cannot answer your question. I just do not know how much technology is available and how far it could get us—what the realistic goals are.

My point is, it is going to be difficult to get to anything like that and that is why I think we need to look at the same time at the growth problem in traffic.

Senator BRYAN. Dr. MacKenzie, I share your concern. I think your testimony has been invaluable to the Committee, but in order to build in a legislative predicate I think you would be the first to acknowledge that there has to be an element of pragmatism. That is, we must have something in the record to support, if we do put a number in, whether it is 45, or 40, by the turn of the century.

Dr. MACKENZIE. I think that is where the importance of a goal comes in. Exactly what are we trying to accomplish? 45 miles per gallon may or may not reduce oil use, depending on the traffic conditions. I would defer to Debbie on this one as someone more knowledgeable with the exact technological opportunities, whether 45 on the road is a realistic goal.

I would support such a goal but I think it is not going to get the job done that you want to be done.

Senator BRYAN. Miss Bleviss, then let me turn to you, if I may. In your testimony, both written and oral, you have indicated there seems to have been a backsliding, I believe is the word. Over the years OTA and others have seemingly retracted from the position as to what could be achieved within a certain parameter of time. Let me ask you, is that as a result of a more enlightened technology, a more accurate technology, or are there other considerations which cause that to occur.

Ms. BLEVISS. I would say probably a little bit of both. The earliest projections made in the late 1970s were made assuming a fairly heavy penetration of diesels. They were also assuming some shift in mix occurs, and neither of those assumptions are used in the models being developed today nor would any of us endorse such assumptions.

On the other hand, there has definitely been—unfortunately I have been a witness to this—a gradually more conservative stance taken by such studies as to where technologies will take us, in response to criticism from the industry.

Now, I am not going to say one way or the other whether this is good or bad. It is just important for us to recognize that when you are asking an analyst to go out there and make a projection and take a lot of heat on the basis of that projection, it is not surprising that the projection is going to change.

One of the problems we have, frankly, is that there are very few independent analysts out there, and when you have very few independent analysts out there, you leave the road wide open for those few people who are trying to project the possibilities to come under pressure.

Senator BRYAN. Let me ask you, based upon your understanding of what the technology will allow us to reach, what is your recommendation for 1995 and the year 2001—again, to track the provisions of this bill? Or do you favor an incremental approach as was suggested by the Commissioner for New York State, or different time frames?

What we were trying to do in the legislation, as you understand, is to respond to the concern that the industry raised, that look, we are already locked in to a certain extent to the product mix, to the technology that is rolling off the assembly line today. Rather than to require an incremental increase as the original CAFE legislation did, we tried to give them a window in which they have a maximum flexibility.

Could you discuss, from your perspective, what you think we can do and whether or not that approach that we have taken is the best approach?

Ms. BLEVISS. I commend you on your approach. I think the annual incremental requirement was an unduly onerous requirement on the industry. However, you as policymakers bear a burden, which is that the increasing flexibility that you build into a law is heavily conditioned on the willingness of the industry to accept the responsibility of that flexibility.

I do not want to speak negatively or positively for the industry, but I just want to point out that the recent history has not really demonstrated a responsible attitude by the industry with regard to flexibility vs. fuel economy laws.

I think the flexible approach in your law is what should occur, but I think that we take on an additional responsibility on ourselves to have additional faith that the industry will live up to the honor of that flexibility, so to speak.

Senator BRYAN. If I could have you focus on the numbers now for a moment, based upon your understanding of the technology, where can we be in 1995 and where can we be in the year 2001?

Because Mr. MacKenzie has framed the issue coming from the other direction, that the enormous increase in vehicle miles traveled is going to create enormous problems if we do not reach the 20 percent reduction, and he is talking about the global impact.

I am asking you to address the more pragmatic issue, and that is, where can we get, as you understand the state of technology that is available, by 1995 and the year 2000. Could you quantify that in a number for us?

Ms. BLEVISS. Let me respond first of all to the 1995 number. It is absolutely true that the industry is much more locked in for 1995. On the other hand, as Mr. Bieber noted earlier, the industry does have some flexibility in increasing the rate of penetration of certain technologies already planned for production, but in much more limited numbers.

Let me backstep and say that I do not want to frame a specific number by the year 1995. I would prefer addressing the 45 by the year 2000.

But let me point out that it was precisely in recognition of this locked-in characteristic that the original fuel economy law was structured so that the ramp up in fuel economy improvement was very slow initially, and then over the last five years it went very rapidly. That structure was designed in recognition of the fact that the industry had a certain locked-in structure in the first few years that the law was applied.

Let me point out, however, that that heavily ramping requirement in the last years of the previous fuel economy law was what drew the most virulent criticism from the industry and led to some of the unfortunate game playing that we have seen recently.

So if you opt for a rapid ramp up in the last 5 years of your law, you must address how you avoid some of the problems that we have seen most recently.

How do you avoid the industry out-sourcing as a mechanism for meeting the requirements, as opposed to really introducing new technologies? That is a problem. Nevertheless, I would certainly agree in the abstract that one should start out slowly and then ramp up.

Senator BRYAN. From your perspective, would we be better advised, as the Congress, to not have a 1995 threshold and simply say, look, by the year 2001 you have got to get to 45 miles per gallon?

Ms. BLEVISS. I think in that scheme you are taking a huge risk, and I would argue that a 20 percent figure is doable for 1995, but I would be willing to live with a lower figure as long as you do not let go of the 2000 figure.

Senator BRYAN. Thank you very much. Senator Gorton?

Senator GORTON. My question really follows the implications of your last answer. Let us make it very simple.

Is it the view of each of you on the panel that if we do not have some kind of increased mandatory standards, if we do not pass a CAFE bill, that we are simply not going to get any significant— increase in the use of fuel-efficient technologies out of the manufacturers. If we do not mandate it, they will not do it.

Mr. YEAGER. The analysis that we have seen seems to indicate that—and it is all very murky based upon projections of fuel prices and things like that—that you could get to 34 miles per gallon, 35, 36 maybe, by the year—by the late nineties without standards. That is not certain. You could get something.

But, it seems to us that you have—that we need to force the pace. We are sensitive to the kinds of questions that are raised, for instance, by Mr. Bieber about the ability of the industry to be flexible for the 1995.

It is clear to the extent there is flexibility for it to be brought into play, the government has to set a standard. In fact, it is very important for a standard so that the auto industry has an incentive to make the gains that they can possibly make by the year 1995 and by the year 2000. Without that we think that the gains are likely to be considerably less and certainly a drop in the bucket against the need.

Ms. BLEVISS. If I could just respond, I think I am less optimistic that those gains will be seen. If we can just again look back in history, the industry has a very nicely defined market niche right now. There is no real force asking the industry to look out in the future and change its present strategy.

As was pointed out by Mr. Bieber, it takes 5 years for the industry to bring out a new type of model, in essence to be able to markedly change its product line. If we had the disaster, say, of an oil crisis hitting sometime in the early 1990s or even the mid-1990s, we are going to have a time lag before we actually see fuel efficient cars on the road in response to the crisis. And, unfortunately, I think that while there are cost-effective fuel efficiency improvements that could go into cars now in anticipation of a future crisis, the industry is not getting the message at this point to engage in such contingency planning, I do not fault them for not making those kinds of improvements, but it is important to realize they will not alter their plans vis-a-vis fuel economy until they see a dramatic change in the market and that, unfortunately, will be unlikely to occur either in the absence of federal legislation or an oil crisis.

Dr. MACKENZIE. You did not mention the issue of oil prices. As you know, gasoline prices in constant dollars have never been lower, period. They are around 45 cents a gallon in 1974 dollars.

Based upon my review of the oil situation, including our declining domestic production, I think OPEC is going to be able to control prices within 5 years. Traditionally when they have been at 80 percent of their capacity, they have been able to control prices. I do not think they will jack them up. They have learned that causes recession and too many problems. But I think they will increase prices and how quickly that occurs depends on things like Soviet Union production, North Sea production, and so forth. But I see prices going up.

Improvements in fuel efficiency could be accelerated through revenue-neutral taxes which would, I think, accomplish many of the goals that you are trying to achieve. It would be a rather difficult adjustment period as people shift their patterns of buying and mixes of cars and so forth, but I think that prices on fuels and gas guzzler tax, that sort of thing, could provide the incentive that Debbie has mentioned for people to demand these cars and manufacturers to produce them.

Senator **Gorton**. Thank you, Mr. Chairman.

Senator **Bryan**. Thank you very much, Senator Gorton.

Senator Gore.

Senator **Gore**. Thank you, Mr. Chairman. I apologize to the members of the previous panel for not being here for their two statements, but I have been briefed on what they have said, and I am glad that they were favorable to a couple of the ideas we discussed with Mr. Bieber, and I would like to pursue those same proposals with this panel.

First, though, let me acknowledge the contributions that these three witnesses have made, Mr. Chairman. They have been real leaders in this effort and, Ms. Bleviss, we have enjoyed working with you on S. 201 which I referred to earlier.

Let me ask you first of all about the approach that you have been most closely identified with and the criticism that has been mentioned earlier, and that is that the easy gains have already been achieved by some and not by others, and you penalize those who have already gone there first. And I know you are very familiar with that, and I want to give you your best shot at answering that.

What is the response to that criticism?

Ms. **Bleviss**. I think there are a couple of issues that really come up. The issue of the easy gains, I think, is probably a bit overstated. If you look at most of the size classes other than the subcompact cars, for example, the compact class or the midsize class, you find that there is not much spread in fuel economy, interestingly enough, amongst those car lines, American or Japanese.

Yes, there is some more advanced technology—you are correct—in many of the Japanese car lines as compared to the Americans, but there is not all that much more.

Senator **Gore**. But the foreign producers, if you will forgive me interjecting this, have concentrated more on the very class and size of cars where the gains have been made, so it does not really answer. It is just to say that it is mostly in the smaller cars because that, again, brings up the same question.

Those manufacturers of the smaller cars primarily overseas have made the gains before we have and, therefore, they are up against it in the manufacturer by manufacturer approach whereas our manufacturers have a chance to sort of take it easy for a while, and then there is a subsidiary concern which is that the foreign manufacturers may respond by leaping forward, leaving our manufacturers in the dust.

Ms. **Bleviss**. Let me respond very quickly. As I said, I think that there is—and my studies have shown that—there is a technological superiority now in terms of the fuel economy technologies of the foreign producers, particularly the Japanese compared to the Americans.

On the other hand, the spread is, first of all, not all that great. Secondly, I think that the major Japanese concern about the percentage approach—and it is an important concern—is that the Japanese producers now would like to bring in some of their larger cars. And compete with some of their larger cars and the percentage approach could preclude them from assuming such a strategy. This is really the major concern for them, I think, rather than the pushing on technology.

I think that that is a legitimate issue that they have to raise and U.S. policymakers have to address it. It has some fuel economy implications, but it has a lot of other greater trade implications that really have to be broached by U.S. policymakers.

On the issue, however, of what is fair and what is not fair, unfortunately, none of these approaches are really fair. And if you look at the CAFE approach, we could argue that the CAFE approach could have been used by the domestic manufacturers as an opportunity to make a technological leap forward, but they did not seize it. They saw it as having more problems than solutions.

The Japanese could well look at this as a technological opportunity, or they could see it as a disaster. Unfortunately, we cannot control everything related to these laws and if they choose to take the technical advantage and move forward in competitiveness, my hat is off to them.

I do not think that this law is going to be so easy-going as to allow the domestics to "slide into place," so to speak, to meet the standards, and I am sure you are going to hear a lot more to this effect.

Senator GORE. You have not seen the final product out of the Commerce Committee yet either, but my hat is off to you all the more because there is no easy magic solution to this, and any way you go is really tough, and I appreciate the work you have done on it.

Let me ask all three witnesses about the two ideas that I floated earlier. First, the direct fee on emissions coupled with the rebate for a—for the purchase of more fuel-efficient new automobiles.

I know you all are familiar with the idea, or I hope you are. I think that it has a lot of promise. I have called for a CO_2 tax in the past and to make it revenue-neutral as it applies to automobiles by coupling it with this rebate is an idea that has a lot of benefits, and I am wondering what your reaction to it might be.

Mr. YEAGER. Well, I think that to take the two parts of your proposal, first I would say that we have traditionally supported a more narrow version of your second proposal which is that we have supported a gas sipper/gas guzzler tax, gas sipper rebate, and we continue to think that that kind of a financial incentive is a good idea, particularly as a supplement to a standard-setting process.

We do not think—we have not in the past considered that it could take the place of a standard-setting process, but as far as extending the concept like that to deal with an overall emissions quotient, that is something that I think we would like to look at in a lot of detail.

Senator GORE. You have got 16 groups to check with, though.

Mr. **Yeager**. Well, it obviously has implications with regard to strategies for clean air. There has been a long debate, both inside and outside the environmental community, about the best way to achieve urban air quality and suggestions have been made at different times that you can get more engineering creativity, let us say, out of the auto industry if you find some way to let them meet an overall performance standard for a car.

On the other hand, it is harder to measure an overall performance standard for a car. You are not generally just dealing at that point with tailpipe emissions. You also have to deal with engine, the volatile hydrocarbons that come off the engine and the gas tank, and you have to deal with the car as an overall envelope, and it becomes harder to measure. And there are reasons why we are cautious about that kind of approach. And I would never reject it out of hand, but I think it takes some looking at.

Senator **Gore**. Dr. MacKenzie.

Dr. **MacKenzie**. There are, I think, to follow up on what Brooks has indicated, implied trade-offs between hydrocarbons and CO_2, and I would not—I do not know how to set those myself. But I think a tax on CO_2 makes eminently good sense, and it begins to internalize the costs.

Now, how sensitive consumers are to first costs as opposed to operating cost is another issue. I think that fuel taxes would tend to maybe encourage more efficient driving habits and maybe more use of public transit as well as more efficient vehicles. So it is conceivable that both of them together might be the best approach.

Senator **Gore**. Ms. Bleviss.

Ms. **Bleviss**. I would tend to echo my colleagues. I think in particular I find that your CO_2 proposal is a very interesting one because it is very closely related to the gas sipper/gas guzzler proposals that I have made in the past.

I also find that—as I understand this proposal, it would be a size class-based—a size class-based incentive is a positive approach because you would be trying to encourage gas sippers in every single class. I think this is an extremely good idea.

I will defer to my colleague from the Audubon Society to respond to the issue of the other emissions, but I would like to make one other comment which is that again, I think the structure of these schemes is very important. They need to be tied to a standard, so as to establish a benchmark in time.

Senator **Gore**. Well, what I have suggested is a coupling of the emissions fee rebate idea with a size class standard forcing measure. And that is the second idea. And we have run out of time, but if you could briefly respond to that one as well, I would appreciate it.

Ms. **Bleviss**. Just very quickly, I think I share Mr. Bieber's concern that this approach is probably one of the most expensive ways to regulate the industry. What you are essentially asking them to do is rather than have some flexibility and focus on one size class at a time experiment with technologies in that class, and then apply them more widely, you are asking the industry to look at every single size class simultaneously, and thereby take a much larger risk.

Senator **Gore**. Should they not?

Ms. BLEVISS. It is a very expensive way to go. To the degree that one wants to devise regulations.

Senator GORE. Unless there is a common solution, unless there is a common solution.

Ms. BLEVISS. But, again, I think that the issue is if you look at how you bring a product forward, you really want to test it in one model or one controlled set of car lines first and feel more confident in that line before you bring it out across the board.

Another quick comment on the size class standard, I do not know what my colleagues from the auto companies will say following this panel, but this idea was broached to them at a recent hearing held by the Department of Transportation to develop a national strategic transportation plan. One of my colleagues from Chrysler responded with "Sure, we will do it; we will just wipe out our small car lines."

I think that is a very telling answer. It is an expensive way to go. And inadvertently what it may force the industry to do is to give up certain car lines because they need to control costs. I do not think that is what we would really not want to occur.

Senator GORE. But, again, if it is coupled with the other measure, then they cannot take that approach. But, we have run out of time and I apologize to the Chairman, but if either of you have a brief response.

Mr. YEAGER. Well, I would only say briefly that we would certainly be willing to look at any proposal like that. On the other hand, we feel an urgent need to make real progress, and we see a potential to the extent that we could use some of those ideas and supplement the current effort.

We would like to make progress this year. We would like to see the Senate act on auto efficiency before next spring so we would have a chance to get into that conference committee where we would have the battle of our lives probably, but we think it is urgent enough to demand an immediate response.

Senator GORE. Thank you.

Senator BRYAN. Thank you very much.

Senator Gore, we are going to take a renal break for about ten minutes, and then we will reconvene with the next panel.

Thank you very much for your testimony.

[Recess]

Senator BRYAN. The subcommittee will reconvene, and our next panel consists of Mr. R.R. Boltz, vice president advanced product and operations planning for the Chrysler Motors Corp., Dr. Marina N. Whitman, vice president and group executive, public affairs group, General Motors Corp., Mr. Hal Bracken, the group vice president, parts, service, customer relations, and U. S. products of Toyota Motor Sales.

We would like to officially welcome the panel this morning, and we will begin our testimony with Mr. Boltz. Good morning or I should say good afternoon now, Mr. Boltz.

STATEMENT OF R.R. BOLTZ, VICE PRESIDENT, ADVANCE PRODUCT AND OPERATIONS PLANNING, CHRYSLER MOTORS CORP.

Mr. Boltz. Chrysler appreciates the opportunity to appear today to express its views concerning proposed revisions of the corporate average fuel economy standards included in Senate bill 1224.

The percentage increase approach is a laudable improvement compared to an absolute CAFE standard because the burden of achieving further fuel economy or fleet fuel economy increases will be distributed equally among all manufacturers.

The proposed levels of improvement for 1995 and the year 2001, however, are not practical. We understand the intent of S. 1224 is to seek fuel efficiency gains using currently available technology and without significant changes in the size, mix or performance of the fleet.

The bill as drafted will not achieve these results. Substantial technological improvements and a radical shift in mix toward smaller four-passenger vehicles from five and six-passenger cars will be required to meet the 20 percent level of improvement proposed for 1995, and the 40 percent level of improvement for the year 2001.

With gasoline projected to remain inexpensive for the foreseeable future, there is no basis for the commercial feasibility of such a mix shift.

Chrysler recognizes the need to improve fuel economy as evidenced by its consistent performance in achieving the CAFE standards established in 1975, but we cannot be placed in a position of being at war with our customers to achieve these improvements by further downsizing.

With gasoline at bargain basement prices, there is little incentive to purchase fuel-efficient small cars. As noted in Chrysler's May 2nd testimony, the importance of fuel economy as a purchase consideration has dropped from second to ninth.

Furthermore, a maturing "baby boom" generation is entering a stage of life favoring the purchase of family-sized vehicles.

Market trends suggest that the industry may encounter difficulty in achieving present CAFE standards. In many instances we have already harvested the low-hanging fruit and fully diffused beneficial technologies, such as front wheel drive, in our existing passenger car fleet.

Nonetheless, modest gains are feasible by further diffusing other technologies that provide fuel economy benefits.

Chrysler believes it can achieve an improvement of 6½ percent in CAFE for 1995, equivalent to 29.5 miles per gallon. This level is consistent with the range of 29–31 miles per gallon projected by Linda Stuntz of the Department of Energy in testimony before the Energy and Commerce Committee of the House of Representatives on July 13 of this year.

Light truck CAFE potential in the range of 22–23 miles per gallon, as projected by Ms. Stuntz, should be achievable by 1995.

Chrysler also believes a cumulative improvement in car CAFE in the range of 10 to 15 percent compared to 1989 is feasible for the year 2001. These projections are based upon the diffusion of technology available to Chrysler adjusted for market conditions expected to prevail during the decade of the 1990s. The projections do not include the effects of more stringent safety or emissions regulations, either of which could substantially reduce the prospects for fuel economy improvement.

Amendments to the Clean Air Act, including an alternative fuels program, are presently being considered by Congress that would become effective in the same time frame as the proposed CAFE revisions.

Although S. 1224 recognizes the need for adequate lead time, a 1996 effective date, rather than 1995, will permit a more orderly development process on all of the regulatory fronts and ensure that the quality expectations of the American consumer are not compromised.

In summary, the bill contains substantial improvements in the structure of CAFE standards compared to present methods, but the proposed levels of fuel economy increase for 1995 and the year 2001 are not commercially feasible and should be reduced.

The rate of improvement presently required by S. 1224 cannot be sustained throughout the 1990s without substantial changes in consumer behavior and further downsizing of the fleet.

Thank you for your attention.

[The statement and questions and answers follow:]

RECORD STATEMENT OF CHRYSLER CORPORATION

Presented to the Senate Consumer Subcommittee of the
Committee on Commerce, Science and Transportation
September 7, 1989

Thank you and good morning. I am Ronald Boltz, Vice President of Advance Product and Operations Planning for Chrysler Motors Corporation.

Chrysler Motors appreciates the opportunity to express our views concerning Senate Bill 1224, which would amend and extend the Corporate Average Fuel Economy requirements included in the Motor Vehicle Information and Cost Savings Act of 1975 (MVICS). Our views concerning the efficacy of CAFE regulations, and our experience in meeting these requirements, were summarized by Mr. Robert G. Liberatore on May 2, 1989. Therefore, my remarks this morning will be directed primarily to the revisions proposed in S.1224.

CAFE standards are an indirect and incomplete approach, at best, to achieving National energy conservation goals. Any CAFE scheme contains the potential, latent or otherwise, for market distortions and competitive disadvantage. If CAFE revisions must be considered, then these revisions should be made consistent with the following policy objectives:

- Require all manufacturers to improve fuel economy, to equalize the burden of achieving CAFE improvements.
- Minimize the inherent potential for market distortion and competitive disadvantage.

Chrysler believes the percentage increase approach, in combination with floors and ceilings, offers the best potential to satisfy these objectives, but the levels of improvement proposed are not practical. The base year should be adjusted to the most recent data available at enactment. Provisions to expand fuel economy testing without demonstrable benefits are burdensome and costly.

Chrysler's primary concerns relate to the percentage improvements proposed for 1995 and 2001. Specifically, the 20% improvement for 1995 and 40% improvement for 2001 cannot be achieved without downsizing of product offerings to a degree that will be unacceptable to consumers.

We believe the percentage increases specified in S.1224 were based, at least in part, upon Office of Technology Assessment projections that suggest a 1995 U.S. fleet average fuel economy improvement potential of 17.3%, by diffusing existing technology throughout the fleet.

Mr. Steve Plotkin of OTA has made it clear that these projections do not reflect the capabilities of individual manufacturers - - the projections apply only to the U.S. passenger car fleet as a whole and are based on 1987 model fleet mix and performance levels.

CHRYSLER ANALYSIS OF OTA TECHNOLOGY ASSESSMENT

Fuel Economy Benefit of Each Technology

At OTA Penetration Increase Where Possible

	OTA				CHRYSLER TECHNICAL ESTIMATE		
Technology *	Fuel Economy Gain %	OTA's Est. Fleet (Industry) Penetration 1987 %	OTA's Est. Fleet % Penetration 1995	OTA's Est. Fleet % FE	Fuel Economy Gain % Per Unit	Chrysler Fleet Penetration 1989 %	Fleet Potential Fuel Economy Gain %
Front-Wheel Drive	12.0	78.0	88	1.2		98	NIL
- Drivetrain Efficiency					NIL		
- Packaging, Weight 1 TWC					1		
4-Cylinder/4-Valve	10.0/5.0	5.0	45	3.0	5	0	2.3
Four-Speed Automatic/CVT	7.5	35.0	75	3.0			
- 3-Speed Non-L/UP to L/UP					3	9% Non-L/UP	0.3
- 3-Speed L/UP to 4-Speed L/UP					2	24	1.0
Electronic Transmission Control	1.5	2.0	82	1.2	0-0.5	24	0.3
Aerodynamics (C_D from 0.37 to 0.32)	3.4	N/A	100	3.4	2.5	Base	2.5
Tires	0.5	N/A	100	0.5	0.5	Base	0.5
Accessories	1.0	N/A	100	1.0	1	80	0.2
Engine Improvements							
- Overhead Cam Engines	6.0	40.0	60	1.2	NIL	98	NIL
- Roller Cams	1.5	40.0	80	0.6	2-4	76	0.1
- Low Friction Rings/Pistons	1.5	N/A	80	1.2	0.5	50	0.2
- Throttle Body Fuel Injection	3.0	31.0	41	0.3	3.4 vs. Carb	98	(0.7)
- Multiport Fuel Injection	7.0	45.0	55	0.7	5.0 vs. Carb	35	1.0
Total 1995 B/(W) 1989				17.3%			7.7%

* OTA Assumption of Attainable, Cost-Effective Fuel Efficiency Technologies: 1995 gasoline price - $1.10/gallon (1987 $); 4-year timeframe for fuel savings; 10% discount rate (OTA considers these technologies to be "off-the-shelf")

NOTE: This is not Chrysler's Penetration Plan

Chrysler has developed a projection of CAFE capability for 1995 using an approach similar to that employed by OTA. The results are summarized on the facing page, indicating a potential improvement of 7.7% compared to Chrysler's 1989 EPA status (February 1989). There are two primary reasons why Chrysler and OTA projections differ:

1. The OTA has assumed diffusion of technology across the U.S. fleet that Chrysler already employs at a high rate. For example, in 1989, Chrysler's passenger car offerings are 100% front wheel drive. Obviously, Chrysler cannot further improve CAFE by expanding use of this technology as OTA suggests for the fleet as a whole.

2. We believe the benefits of the technologies listed by OTA either have been overstated or counted twice in the OTA analysis. For example, front-wheel drive does not improve fuel economy per se. Rather, it leads to package efficiencies that provide weight reduction benefits of about one test weight class, improving fuel efficiency by about 1%, not 12% as stated by OTA.

It should be noted that the 1995 7.7% CAFE improvement potential, compared to 1989 results, assumes market conditions are identical to those that prevailed during the 1989 model year, a remote prospect. Although long-range forecasts of market conditions are highly uncertain, extrapolation of present trends indicates the car market is moving in a direction that will be detrimental to CAFE improvement. Buyers appear to be placing a premium on vehicle performance characteristics, and less emphasis on fuel economy. A maturing "baby-boom" population entering their middle years is expected to increase the demand for mid-size and family-sized vehicles.

The net result of these trends is to reduce Chrysler's 1995 CAFE potential to approximately 6.5% from the 7.7% projection at constant mix. Therefore, Chrysler concludes its CAFE potential for 1995 is about 29.5 mpg, consistent with the 29-31 mpg range projected by Ms. Linda Stuntz of DOE in testimony before the Committee on Energy and Commerce in the House of Representatives on July 13, 1989. (It appears that DOE also has discounted the OTA analysis in establishing its CAFE range projections for 1995).

S.1224 also establishes fuel economy improvement goals for light trucks at +20% for 1995 and +40% for 2001, relative to 1988 model results. Chrysler does not understand the basis of these proposed requirements. If these requirements are based upon the OTA analysis, the Committee should recognize that OTA addressed only the passenger car fleet, not light trucks. Projections of passenger car capability do not apply to light trucks, and vice-versa.

Ms. Linda Stuntz of DOE has projected 1995 light truck CAFE capability at 22-23 mpg. Chrysler's internal projections are consistent with the mid-point of that range.

CHRYSLER ANALYSIS OF OTA MAXIMUM FEASIBLE FUEL EFFICIENCY TECHNOLOGIES

Fuel Economy Benefit of Each Technology

At OTA Penetration Increase Where Possible

	OTA				CHRYSLER TECHNICAL ESTIMATE		
Technology	Fuel Economy Gain %	OTA's Est. Fleet (Industry) Penetration	OTA's Est. % Penetration Increase	OTA's Est. Fleet % FE	Fuel Economy Gain %	OTA % Penetration Increase	Potential Fuel Economy Gain %
Additional Weight Reduction (10%)	6.6		80	5.3	6.6	80	5.3
Aerodynamics (Additional) (C_D from 0.32 to 0.28)	3.4		80	2.7	3.0	80	2.4
Multiport Fuel Injection (Over TBI)	3.0		40	1.2	1.0	40	0.4
Intake Valve Control	8.0		40	3.2	2.0	40	0.8
4/6-Cylinder 4-Valve	10.0		40	3.0	5.0	40	2.0
Overhead Cam Engines	6.0		40	2.4	NIL	0	NIL
Front Wheel Drive (Additional)	12.0		10	1.2	1.0	0	NIL
Total Additional Over 1995				19.0%			10.9%
MEMO: 1995 Improvement Potential				17.3%			7.7%
2001 Total Opportunity Vs. 1989				36.3%			18.6%

NOTE: This is not Chrysler's Penetration Plan.

It should also be noted that none of the projections, neither those of OTA, DOE nor Chrysler anticipates changes to existing safety and emissions regulations. Substantial revisions to these regulations, principally amendments to the Clean Air Act, have been proposed by the Administration including a comprehensive alternative fuels program. The proposals are stringent, and are timed to coincide with the CAFE requirements outlined in S.1224, placing an enormous burden on Chrysler's product development resources in general, and its powertrain engineering group in particular.

Although S.1224, as a stand-alone regulatory initiative, has recognized the need for adequate lead time, Chrysler respectfully requests that the Committee consider delaying the effective date of CAFE increases to the 1996 model year. This action will allow a more orderly technological development process on all of the regulatory fronts, increasing the prospect for cost effective solutions to achieve CAFE improvements without compromising the quality expectations of the American consumer.

With respect to the 40% increase in fuel economy proposed in S.1224 for 2001, Chrysler believes this level of increase lies beyond the limits of both technological and commercial feasibility. Frankly, projections of technological capability into the third millenium are so uncertain that they amount to speculation. Nonetheless, Chrysler's "best guess" (and that's all it is) for 2001 is compared to OTA's projection on the facing page.

Applying an analytical approach similar to that developed by OTA yields an increase in CAFE of 10.9% during 1996-2001, resulting in a cumulative improvement of about 18.6% compared to 1989 without market condition adjustments, and ignoring the effect of potential revisions to safety and emissions regulations. Factoring in adjustments only for the market trends noted earlier yields a net passenger car CAFE improvement capability of approximately 15% compared to 1989 results, or 31.9 mpg for Chrysler. Our best present judgement of the commercial feasibility of a 15% improvement by 2001 suggests a probability no higher than 50%, with at least one chance in three that the ultimate cumulative passenger car improvement adjusted for market factors could be less than 10%, depending on the future course of fuel prices.

SUBSTANTIAL VEHICLE DOWNSIZING REQUIRED
TO MEET S.1224 REQUIREMENTS FOR 2001

Column 1	Column 2	Column 3	Column 4	Column 5
Size Class	1988 Actual Fuel Economy - MPG	Adjusted Fuel Econ. +18.6% - MPG	Required Vehicle Mix - 2001	MEMO: 1989 Chrysler Mix
Mini Compact	37.4	44.3	50%	-
Subcompact	31.1	36.8	30%	11%
Compact	29.6	35.1	20%	35%
Midsize	26.8	29.5	-	54%
Large	24.3	28.8	-	-
2-Seater	27.2	32.2	-	-
Fleet	28.3	33.5	39.8	

To place the implications of a 40% CAFE increase in perspective, please consider the following example:

- A 40% increase above Chrysler's 1988 CAFE result would require achievement of 39.8 mpg for passenger cars by 2001.

- OTA estimated the sales-weighted harmonic average fuel economy of the 1988 fleet by size class, in Committee testimony on May 2, 1989. As noted on the facing page, none of the individual size class averages exceeds 38 mpg.

- Using Chrysler's maximum estimate of 18.6% cumulative fuel economy potential through 2001 yields the adjusted size class fuel economies noted in column three. The fleet average would be 33.5 mpg, well short of the 39.8 mpg required to achieve a 40% improvement.

- The vehicle mix required to achieve a CAFE of 39.8 mpg is shown in column 4 -- 50% mini compact, 30% subcompact and 20% compact.

- Column five provides Chrysler's present vehicle mix by size class -- 11% subcompact, 35% compact, and 54% mid size.

In essence, the example indicates that, using the best technology available to Chrysler, a 40% CAFE improvement would require a substantial downsizing of the Chrysler fleet. One-half of our sales in the United States would have to be vehicles sized similar to the Chevrolet Sprint and Suzuki Forsa, whereas one half of present sales are represented by entries such as Dodge Dynasty, Chrysler New Yorker and Plymouth Acclaim (replacing Reliant). The net result would be to shift 50% of our buyers from five and six passenger midsize vehicles offering 110-119 cu.ft. of interior space to four passenger mini compact vehicles offering less than 85 cu.ft. of interior space.

With the price of gasoline projected to remain at approximately $1 per gallon at constant economics for the foreseeable future, there is no basis for the commercial feasibility of such a mix shift. Achievement of the proposed CAFE requirements, for 1995 as well as 2001, would require a major change in consumer behavior that is inconsistent with the market forces we expect will prevail during the 1990's.

Consumer concerns about the safety characteristics of micro cars alone may preclude achievement of a substantial mix for these vehicles even if fuel prices rise. As noted in Mr. Barry Felrice's testimony before the House Committee on Energy and Commerce on July 13, 1989 "any developments in the fuel economy program which require substantial downsizing of the passenger car or light truck fleets would raise safety concerns".

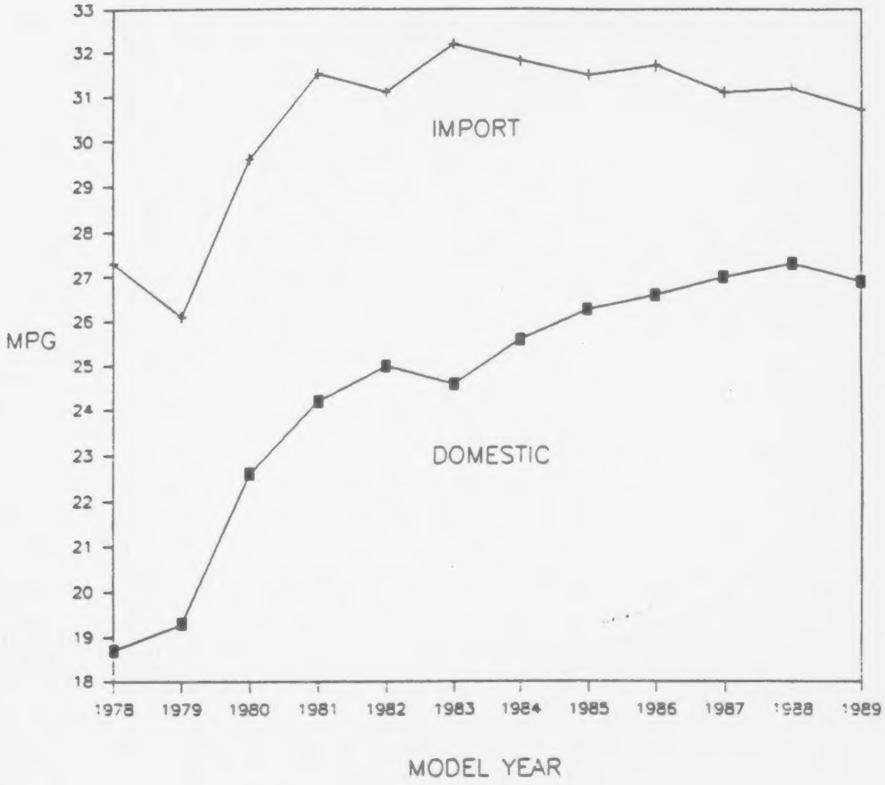
In summary, Chrysler indicated on May 2, 1989 that large increases in fuel economy will require either major technological breakthroughs or significant down sizing, although more modest gains can be achieved without significant downsizing by diffusing existing technology. We presently believe increases compared to 1989 in the range of 6.5% for 1995 and 10-15% for 2001 are both technologically and commercially feasible. Furthermore, Chrysler believes fuel efficiency improvements will continue to be made as the result of competitive forces within the industry, and that revisions to CAFE standards may not be required to ensure their achievement.

In closing, it should be noted that CAFE is only one element of a broader National energy policy presently being addressed by the Administration. To the extent that energy policy priorities remain to be established, Congressional action on CAFE may be premature.

Attachment 1

Fleet Average Fuel Economy by Source

- Domestic Manufacturers Continue to Improve CAFE
- Import Average Fuel Economy Has Declined Since 1983



Attachment 2

CAFE POLICY ALTERNATIVES

Percentage Increase Option is Fair and Required to Limit CAFE Erosion Among Import Manufacturers

	DOMESTIC				FOREIGN		
	Fuel Efficiency gal/100 miles		Fleet Avg Fuel Econ mpg		Fleet Avg Fuel Econ mpg		Fuel Efficiency gal/100 miles
1978	5.35		18.7		27.3		3.66
1979			19.3		26.1		
1980			22.6	4.9	29.6		
1981			24.2		31.5		
1982			25.0		31.1		
1983	30%	8.2	24.6		32.2	3.4	11%
1984	Improvement		25.6		31.8		Improvement
1985			26.3		31.5		
1986			26.6	(1.5)	31.7		
1987			27.0		31.1		
1988			27.3		31.2		
1989	3.72		26.9		30.7		3.26

Memo: Share of U.S. Car Market

1978	85%	15%
1989	60%	40%

Memo: Estimated Gasoline Saved
1989 vs 1978 Fuel Economy
Billion of Gallons

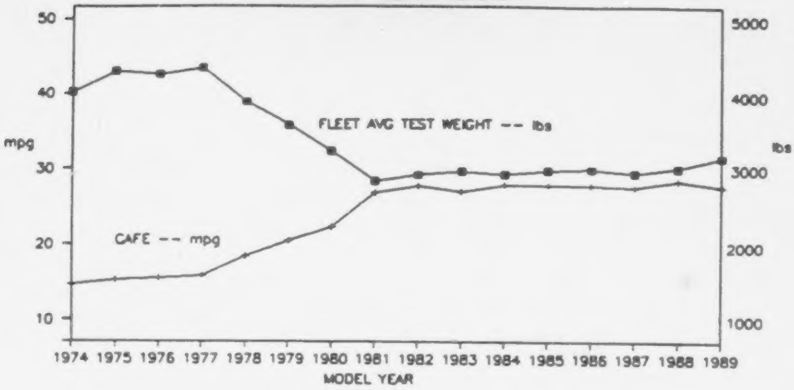
- Annual @ 1988 volume	1.5B	0.2B
- Cumulative 1978-89	59B	7B

Attachment 3

CHRYSLER MOTORS DOMESTIC FLEET

Further Fuel Economy Improvements are Expected
Even If CAFE Standards are not Changed

CAFE / TEST WEIGHT HISTORY



CHRYSLER MOTORS CAFE / WEIGHT / TFC TRENDS

MODEL YEAR	FLEET AVG TEST WEIGHT lbs	DOMESTIC CAFE mpg	TFC/IW gal/100 mi/1000 lbs	
1974	4022	14.7	1.691	
1975	4304	15.3	1.519	
1976	4262	15.5	1.514	DOWNSIZING + TECHNOLOGY
1977	4344	15.9	1.448	
1978	3891	18.4	1.397	
1979	3576	20.5	1.364	
1980	3230	22.3	1.388	
1981	2833	26.8	1.317	
1982	2912	27.6	1.244	
1983	2960	26.9	1.256	
1984	2916	27.8	1.234	TECHNOLOGY DEVELOPMENT
1985	2974	27.8	1.210	
1986	2988	27.8	1.204	
1987	2939	27.5	1.237	
1988	3008	28.4	1.171	
1989	3150	27.7	1.146	

CORRELATION 97%

ANNUAL RATE OF TFC/IW IMPROVEMENT:

1974 - 81	4.5%
1982 - 89	1.3%

PROJECTION:

1995	3202	28.3	1.105

POST-HEARING QUESTIONS OF SENATOR BRYAN

9/7/89 HEARING OF CONSUMER SUBCOMMITTEE

Question 1

Please state your view as to the likely trend in vehicle miles traveled in the United States. If you would project a change in vehicle miles traveled, please state the percentage by which you estimate vehicle miles traveled will change per year between the present and 2005.

Chrysler's Response

Vehicle miles traveled continues to grow in response to a number of underlying forces including the rate economic expansion, population growth, and the price of fuel adjusted for inflation. The rate of growth in VMT, however, appears to be declining. Excluding the oil shock periods of 1973 and 1979, VMT grew at a rate of 5.2% during 1965-1972, 3.7% during 1974-1978, and 2.5% during 1980-1987.

VMT declined significantly during 1974 and 1979, in response to sharp increases in fuel prices and public concerns about fuel availability. These events suggest significant elasticity between real fuel prices and VMT.

Excluding the effects of a potential increase in real fuel prices, VMT is expected to grow at a rate significantly below 2% during 1990-2005.

Question 2

If you project that vehicle miles traveled will increase, please state how you would propose maintaining the current status quo with respect to carbon dioxide emissions and energy consumption from the passenger vehicle sector in light of those increases.

Chrysler's Response

Vehicle turn-over alone, from less fuel efficient older vehicles to new, more fuel efficient vehicles, will reduce fuel consumed by the U.S. passenger car fleet throughout the decade of the 1990s. Vehicle turn-over and fuel economy improvements of about 1% per year will fully offset the effects of a 2% annual growth in VMT through 2005. Passenger car gasoline consumption by 2005, assuming these conditions prevail, will be equivalent to that experienced in 1986.

As noted in response to Question 1, VMT growth can be moderated further by increasing real fuel prices. For this reason, Chrysler supports consideration of a carbon fee, discussed in greater detail in the response to Question 4.

Question 3

As you know, the 1988 International Conference in Toronto, "The Changing Atmosphere: Implications for Global Security", adopted a goal of 20% reduction in 1986 levels of carbon dioxide by 2005. Please provide any plans you would recommend to achieve that goal for passenger vehicle carbon dioxide emissions. Include in your plan any increases you would project in vehicle miles traveled, and state what level of fuel economy you believe would be necessary to achieve that goal.

Chrysler's Response

It is unlikely that CO2 emissions from highway vehicles can be reduced 20% by 2005 solely through diffusion of existing technologies that improve vehicle fuel efficiency. Contrary to present trends, the American public must be willing to accept significant reductions in vehicle size and performance, implying a substantial shift in mix during the 1990s toward smaller, more fuel efficient vehicles.

Such a mix shift cannot be achieved by technology forcing or legislative fiat. Market forces must be brought to bear, in the form of incentives to conserve carbon-based fuels. In addition, no single sector of the economy can bear the burden of a CO2 reduction mandate without severe dislocation. All sectors of the economy must contribute their fair share of the reduction burden. Therefore, Chrysler supports the concept of a "carbon fee", for all fuels containing a carbon atom, and the development of international agreements to apply this fee uniformly.

Question 4

There was discussion at the Subcommittee Hearing of a carbon fee or carbon tax, and such a measure was recommended by some aspects of the auto industry as a means of dealing with carbon dioxide emissions. Please provide a detailed discussion of the type of carbon fee or tax you would recommend. Include in your answer your opinion on whether the monies collected from such a fee should be earmarked for any particular purpose, such as a rebate to encourage the purchase of fuel efficient vehicles.

Chrysler's Response

The principal objectives of the carbon fee should be:

- Enable long term control of CO2 on a global basis.
- Avoid economic injury to any single sector of the economy, or to any nation.
- Index the fee to the observed and forecasted CO2 levels as scientific evidence emerges.
- Encourage and reward judicious management of fossil fuel resources.

The exact mechanisms required to apply a carbon fee are beyond Chrysler's field of expertise, but the following general suggestions illustrate the concept proposed:

- A carbon fee could be imposed on the first domestic use of all carbon based fuels, including oil, natural gas and coal.
- The fee would be proportional to the amount of carbon content per unit of energy, providing a conservative incentive.

Chrysler believes it would be premature to suggest uses for the revenue generated by a carbon fee. Rebates to encourage the purchase of fuel efficient vehicles are addressed in the response to Question 5.

Question 5

Please provide your views on the effectiveness of a fee/rebate scheme that would collect fees for the purchase of vehicles with low fuel efficiency and use those fees to provide rebates as incentives for the purchase of highly fuel-efficient vehicles.

Chrysler's Response

Implicit in the concept of taxing less fuel-efficient vehicles and using the revenues to create incentives for the purchase of more fuel-efficient vehicles is the notion of trying to bring market forces to bear to effect conservation. While Chrysler supports the notion of market-driven conservation, we are skeptical about the efficacy of such a tax/rebate scheme. In the near term, it is likely to have the effect of damaging domestic producers and creating an incentive for the import of more foreign vehicles. Because the rest of the world has high fuel taxes, there is enormous existing foreign production capacity to produce fleets of predominantly micro and subcompact cars. Although no domestically-made car currently pays a gas guzzler tax, if the level at which vehicles are taxed were changed even modestly, millions of U.S.-made vehicles would be subject to the tax.

But setting aside the impact of such a scheme on American jobs and the U.S. balance of trade, it is a much less efficient system for conserving fuel than a carbon fee applied to all carbon-based fuels, or an increase in the gasoline tax. Tinkering with incentives on the purchase of new cars has no impact on fuel usage in the 170 million vehicles currently on the road. It will not encourage car pooling, use of mass transit, more careful driving habits, etc. Further, such a tax/rebate scheme on vehicles will have no impact on the large number of vehicles which fall in the middle of the spectrum between very fuel efficient and least fuel efficient. By comparison, increased fuel taxes would encourage the purchaser of a compact car, for example, to opt for a powertrain which is more fuel efficient. A tax/rebate scheme is unlikely to have such an effect since its impact would occur at either end of the fuel-efficiency spectrum.

If Congress is serious about achieving significant reduction in man-made CO2 emissions, then Congress must be willing to face the admittedly politically difficult choice of raising the cost of carbon-based fuels. Anything short of that will not yield significant conservation, and will cause significant disruption to American industry. We live in a market economy. Generally the price mechanism is far superior to command-and-control regulations.

Question 6

Please state what average levels of fuel economy, for both cars and light trucks, you believe your fleets will attain in 1995 and in 2001.

Chrysler's Response

As noted in our testimony on September 7, 1989, Chrysler believes it can achieve a 6.5% fuel economy improvement for 1995, and 10-15% for 2001, compared to 1989. These projections do not include the effects of anticipated changes to existing safety and emissions regulations. Furthermore, the projections assume fuel prices and consumer preferences for vehicle size and performance levels remain equivalent to present conditions.

Question 7

You testified at the recent hearing of the Consumer Subcommittee in opposition to S.1224. Assuming for the purpose of this question that fuel efficiency must be improved over the next decade to the levels set by the Legislation for 2001, please provide alternatives to S.1224 that you would recommend to achieve improved fuel economy at the levels established by the Legislation. If you do not believe such levels are possible, please provide alternative forms of regulation or alternative levels of fuel economy that you believe are feasible and would achieve the maximum possible improvement in the fuel economy of the passenger vehicle fleet.

Chrysler's Response

Chrysler did not oppose key elements of S.1224 related to the structure of fuel economy standards. Chrysler supports the proposed percentage increase approach, but did object to the levels of increase required for 1995 and 2000. The proposed increase of 20% for 1995 and 40% for 2001 are commercially infeasible and technologically unsound if present vehicle size mix and performance levels are maintained. Chrysler's fuel economy improvement capabilities for 1995 and 2000 were highlighted in testimony on September 7, 1989 and in response to preceeding quesions.

Senator **Bryan**. Thank you very much, Mr. Boltz.

Dr. Whitman, welcome back.

STATEMENT OF DR. MARINA N. WHITMAN, VICE PRESIDENT AND GROUP EXECUTIVE, PUBLIC AFFAIRS GROUP, GENERAL MOTORS CORP.

Dr. **Whitman**. Thank you, Mr. Chairman. I appreciate this opportunity to testify today. GM's commitment to improving fuel economy has been and continues to be significant. Just in the last 10 years we have committed over $50 billion for new products, plants and equipment to be able to build fuel efficient cars and trucks.

In considering S. 1224, it is important to note at the outset that clean air legislation pending in Congress will have a major impact on the auto industry and on its CAFE. We think there is a consensus that this legislation should be given priority consideration, and we sincerely hope that efforts, which we support, to pass a responsible clean air bill will not be diverted by simultaneous action on CAFE. We have often witnessed the unhappy convergence of uncoordinated energy, safety and air quality legislation, and the results have usually fallen most heavily on our consumers.

We appreciate Senator Bryan's proposal to correct one of the most troubling aspects of the CAFE program—the unintended effect of creating a competitive handicap for full-line domestic manufacturers. We do not think it is possible, however, to fix the CAFE program. CAFE fails because the law pressures producers to build still more fuel efficient vehicles without creating incentives for consumers to buy them. We continue to believe—and I refer you to our previous testimony before this subcommittee—that increasing CAFE standards would be either ineffective or unjustifiably costly for U.S. vehicle manufacturers, our customers and the economy. In addition, there are safety concerns. As an official of the National Highway Traffic Safety Administration recently testified, any developments in the fuel economy program which require substantial downsizing of the passenger car or light truck fleets would raise safety concerns.

Our opposition to the CAFE program emphatically does not mean lack of support for energy conservation or energy security. Since 1974, GM has made product changes resulting in an improvement in our fuel economy exceeding 130 percent. We continue to seek new ways to improve fuel economy. Current research efforts focus on alternative fuels and on improvements on the internal combustion engine, including two-cycle and direct injection diesel engines. We are also working on the development of fuel cells and electric and solar-powered vehicles, and we are teamed with the Federal Government on a five-year project to develop components for an experimental automotive ceramic gas turbine engine. We are also involved with some State governments in investigations of the potential of intelligent highways to reduce traffic congestion. Regarding energy security, the United States has improved its position with a greater diversity of supply and the creation of a Strategic Petroleum Reserve, which GM supports.

Putting aside for a moment the issue of CAFE's effectiveness, I would like to discuss our concerns with specific features of S. 1224.

First, its fuel economy targets, which for GM would be on the order of 33 miles per gallon in 1995 and 40 miles per gallon by 2000, are not achievable for our fleet if projected energy prices and customer demand follow current trends. We do offer a vehicle now, the GEO Metro, which has a fuel economy of 65 miles per gallon, the highest available in the United States. Cars like this, however, accounted for only 1 percent of U.S. passenger car sales in 1988, indicating that these cars meet the needs of only a small part of the American public.

Thus, absent any unforeseen technological developments, CAFE targets of the magnitude of those in S. 1224 would force us to consider drastic measures such as cutting production of our larger family-sized cars. Other initiatives which will conflict with fuel economy efforts include our plans for a new larger air conditioner necessitated by a chlorofluorocarbon substitute, as well as air bags and antilock brakes. Also, there are tradeoffs between fuel economy and further tightening of emission standards for oxides and nitrogen as proposed in the clean air legislation.

Second, we are concerned about proposed changes to limit the authority of DOT to adjust CAFE standards as of 1995 and to impose more stringent time requirements for manufacturers wishing to petition for a change in the standard. This loss of flexibility would remove a key safeguard to prevent job loss associated with unexpected shifts in the economic, competitive or regulatory environment.

Third, requiring trucks to meet the same percentage increases in CAFE targets as passenger cars would not be effective. There are inherent structural, functional and design features that distinguish cars from trucks. While some of the currently available technologies for cars are being used on trucks, others are less applicable because of the higher load considerations and duty cycles required for many truck applications.

Finally, we welcome the recognition in the bill that CAFE gives unintended but significant competitive advantages to foreign manufacturers. Requiring all manufactures, however, to improve fuel economy for a flat percentage increase will continue to pressure domestic manufacturers to cut family-size car production in this country. Thus, this change is not likely to improve significantly the position of full line manufacturers or to prevent the erosion of U.S. jobs.

In conclusion, we believe the use of "command and control" regulatory strategies, such as CAFE, are either ineffective or unnecessarily costly. We believe that if national interests dictate government intervention, then the most effective and efficient government programs must work through, and not against, market forces and include consumer incentives for compliance. We also think that fair public policy should not force a single sector or industry to bear a disproportionate share of the costs. For this reason, and in considering responses to global warming concerns, we have suggested a comprehensive fee approach be considered. Such a greenhouse or carbon fee merits discussion, since it could be assessed on each primary fuel—that is, coal, oil and natural gas—in proportion to its carbon content per energy unit.

Before proceeding with any energy legislation, however, especially CAFE increases, we believe careful attention needs to be directed to establishing the cost-effectiveness of the proposed approach and the tradeoffs, in terms of other social objectives, that would be required.

Thank you.

Senator BRYAN. Thank you very much, Dr. Whitman.

Mr. Bracken.

STATEMENT OF HAL BRACKEN, GROUP VICE PRESIDENT, PARTS, SERVICE, CUSTOMER RELATIONS AND U.S. PRODUCTS, TOYOTA MOTOR SALES, U.S.A.

Mr. BRACKEN. Thank you. Good afternoon, Mr. Chairman and Members of the subcommittee. My name is Hal Bracken and I am Group Vice President for Parts, Service, Customer Relations and U.S. Products for Toyota Motor Sales, U.S.A. I appreciate this opportunity to present our views on S. 1224. Our written testimony has been submitted to the subcommittee.

Senator BRYAN. That will be made a part of the record, Mr. Bracken.

Mr. BRACKEN. Thank you. We at Toyota take pride in our ability to provide vehicles that meet consumer demand for performance and quality, while at the same time contributing to the Nation's air quality and energy conservation goals. Our new car fleet for model year 1988 achieved a CAFE of 33 miles per gallon, the best of any multi-line manufacturer. And we are not resting on our technological advances. We are actively researching all aspects of vehicle design, many of which may improve fuel economy.

It is with this background of corporate responsibility that we express our deep concerns regarding S. 1224 and the uniform percentage increase concept that it contains. Let me explain those concerns.

First, S. 1224 punishes companies that have exceeded current law. Toyota is a leader in employing fuel-economy technology. In testimony submitted to this subcommittee on May 2, the Congressional Office of Technology Assessment found that Toyota's 1988 CAFE significantly exceeded the level that could have been expected from our model mix. In other words, Toyota's high fuel economy levels are not simply due to the size of our vehicles, but to the advanced technology they contain. Our current vehicles employ most and—in some cases—all, of the technologies OTA expects to be available industrywide by 1995.

Toyota, for example, is a leader in the multi-valve engine technology that combines excellent fuel efficiency and good performance. All 1989 and 1990 Toyota passenger cars have multi-valve engines.

Second, S. 1224 is a radical departure from other regulation of the automobile industry. Currently, all emission, safety and fuel-economy standards are applied to all manufacturers in an even-handed manner. After carefully reviewing other environmental regulatory programs, we are unaware of any that establish different standards for similarly situated companies in the same industry.

Furthermore, the approach proposed in S. 1224 would destroy any incentive a manufacturer might have for exceeding the standard in future years, for fear that their performance might become a new baseline for future legislation. This is a dangerous precedent which would be counterproductive to the task of cleaning the environment, promoting safety, and conserving energy.

Third, S. 1224 will not promote the use of best-available technology across all model lines. Increasing the fuel economy difference between high- and low-mileage producers will reduce competition across all market segments, thereby removing the incentive for widespread application of best-available technology.

Finally, S. 1224 probably will not achieve the desired fuel and CO_2 reductions. Companies such as Toyota that have applied high levels of technology may be forced to significantly downsize vehicles or apply a high degree of expensive and exotic technology. The resulting vehicles may not sell because they would be too expensive and fail to provide the desired performance and room. Vehicles sized or priced where Toyota's vehicles are today, and which—under S. 1224—would be required to achieve fuel economy levels Toyota is achieving today, will fill the vacuum. Thus, the anticipated level of CAFE improvement is not likely to be achieved.

Toyota believes the best method to address global warming is a program dealing with broad sectors of the economy. A carbon or greenhouse effect fee, for example, would encourage energy conservation throughout the economy. However, if the Subcommittee is intent on modifying CAFE to address global warming, approaches other than S. 1224 should be considered.

One such approach, referenced earlier by Senators Gore and Kasten, would be percentage increases for each class or size category. This would force all manufacturers to compete car-for-car in the size categories they produce, driving technology improvements across all model lines and eliminating the counterproductive results associated with a uniform percentage increase. In addition, this approach could be designed with procedures to ensure significant fuel efficiency increases while allowing companies to move among categories to meet consumer demand. The CO_2 fee and rebate scheme mentioned by Senator Gore might be one such possibility. But we would want to thoroughly assess its implications.

Thank you very much.

[The statement and questions and answers follow:]

STATEMENT OF TOYOTA

Toyota welcomes the opportunity to present its views on S. 1224, the "Motor Vehicle Fuel Efficiency Act of 1989."

We at Toyota pride ourselves on our ability to provide the public with safe, fuel-efficient and environmentally sound products. Our fleet currently exceeds the CAFE Standard; we were the first auto company to receive an EPA Certificate of Conformity for emissions control; we have never had an EPA-ordered emissions recall; and in many instances, we have applied safety features to our vehicles in advance of government mandate. It is with this background of corporate responsibility that we express our concerns about this bill.

First, S. 1224 punishes those companies who have met or exceeded current law -- a precedent Toyota feels may inhibit companies from exceeding future government standards. Second, this approach represents a radical departure from the existing regulatory process in the automobile industry. Third, this approach will not result in the use of best available technology across all classes of vehicles. Finally, we believe the uniform percentage increase approach contained in S. 1224 is unlikely to achieve the CO_2 reductions/fuel savings desired by the Committee. For these reasons, Toyota must oppose the bill in its present form.

In a written statement submitted to this Subcommittee on May 16, 1989 in response to hearings held May 2, Toyota outlined its views on the relationship of CAFE to global warming and the problems associated with the uniform percentage increase approach.

The Subcommittee also should keep in mind that new safety and emission standards are likely to have a negative impact on fuel economy. The full Senate has recently passed S. 673, which would impose new safety standards that will make all vehicles heavier. In addition, passage of Clean Air Act amendments will impose tighter emission standards. Both actions will have adverse effects on fuel economy. The Subcommittee should take these impacts into account as it considers fuel economy legislation.

Before describing Toyota's concerns with S. 1224 in greater detail we believe it is important for the Subcommittee to understand the steps Toyota has taken already to address Global Warming, Toyota's U.S. production operations, and the use of advanced technology to attain high fuel efficiency for Toyota vehicles. After briefly discussing these points, we will address some of the severe problems associated with S. 1224 and will present an alternative to this bill that may offer a more appropriate means of obtaining greater fuel efficiency.

BROADER BASED APPROACHES THAN CAFE SHOULD BE USED TO ADDRESS GLOBAL WARMING

Toyota believes the best method to address Global Warming and energy conservation is a program which addresses broad sectors of the economy, and does not simply focus on motor vehicles. One approach that appears to have merit is a carbon or greenhouse effect fee, which will encourage energy conservation in all sectors of the economy. Under a properly structured carbon or greenhouse effect fee, consumers of all goods and services will have an economic incentive to conserve energy. Instead of addressing less than one-quarter of total U.S. CO_2 emissions as this bill would, a fee of this nature would address the entire amount. Indeed, unlike S. 1224, a carbon or greenhouse effect fee also would address the issue of increasing vehicle miles traveled which is stated as a concern in section 2(8) of this bill. For these reasons, Congress should carefully consider such a fee as it attempts to formulate a policy with respect to Global Warming.

TOYOTA'S EFFORTS TO COMBAT GLOBAL WARMING

Toyota is concerned about Global Warming and intends to voluntarily phase-out the use of CFC's (freon) both in vehicle air conditioners and other aspects of the vehicle production process.

In addition, Toyota supports EPA and motor vehicle industry efforts to establish a recycling program for CFC's, and will participate in cooperative programs to achieve this goal. EPA and Underwriters Labs (UL) held a press conference on August 30 to announce UL's approval of a series of devices to capture and recycle CFC-12 from vehicle air conditioners. Toyota Motor Sales, USA will encourage its dealers to use recycling technologies to the maximum extent possible. According to prior Congressional testimony by the environmental organization Natural Resources Defense Council, when one charge of CFC-12 is released to the atmosphere, it adds as much to Global Warming as all the CO_2 emitted from the vehicle over 100,000 miles.

Finally, Toyota has the highest CAFE level (33.0 mpg for Model Year 1988) of any multi-line manufacturer in the U.S. market. Toyota believes fuel economy is one of the most important specifications of the motor vehicle and we are always making efforts to improve on our past accomplishments. To improve overall fuel economy, it is necessary to supply high-efficiency vehicles that meet public demand. The U.S. consumer demands not only fuel economy, but well-balanced total performance. For example, diesel vehicles are not accepted by U.S. consumers, even though they usually have very high levels of fuel economy.

TOYOTA'S U.S. PRODUCTION PROGRAM

Toyota currently produces two of its fuel-efficient models in the United States. The Camry is made in Georgetown, Kentucky, and the Corolla is made in Fremont, California. An engine/drive-train plant is currently under construction in Georgetown, Kentucky which will supply engines and drive-trains for U.S.-produced vehicles. In addition, Toyota has recently announced that our fuel-efficient light-duty truck will be produced at Fremont, California, beginning in 1991. Together these facilities constitute an investment of approximately $1.6 billion.

The Georgetown, Kentucky facility is currently employing approximately 3,000 people. The engine/driven-train plant will employ another 500 people. The Fremont plant currently employs approximately 2,700 people, and the expansion for truck production will increase this number by about 700. In addition to direct employment at production facilities, these operations create significant employment for suppliers and associated service operations.

TOYOTA EMPLOYS ADVANCED TECHNOLOGY IN ITS VEHICLES

Toyota is a world leader in employing fuel-economy technology. In testimony submitted to this Subcommittee on May 2, 1989, the

Congressional Office of Technology Assessment (OTA) found that Toyota's fuel economy level for Model Year 1988 significantly exceeded the level that could have been expected from its model mix. In other words, Toyota's high fuel economy levels are not simply due to the size of our vehicles. Toyota achieves high fuel economy because our current vehicles employ most, and in some cases, all of the technologies OTA said will be available industry-wide by 1995. Toyota has made a substantial financial commitment to improve fuel economy through the application of advanced technology. Figure 1 contains the technologies OTA has listed as being available on an industry-wide basis in 1995 and Toyota's existing and projected use of these. As can be seen from this figure, Toyota's commitment to quality includes incorporating state-of-the-art technology into the full range of our vehicles.

Since Congress passed the legislation which established the CAFE program in 1978, Toyota has achieved significant improvements in fuel economy, while at the same time improving interior room and performance. This point is clearly demonstrated in Figures 2 and 3. These figures compare two Toyota models from 1978 to comparable 1989 models. In each case, there has been a significant improvement in each of these categories. For example, the 1989 Camry achieves 10 MPG more City and 18 MPG more Highway than the 1978 Corona, while it has 20 more horsepower and significantly more interior/trunk space. Similarly, the 1989

Corolla achieves 5 MPG more City and 7 MPG more Highway mileage than the 1978 Corolla, while having 15 more horsepower and significantly more interior/trunk space.

These simultaneous improvements in fuel economy, interior space and performance have been achieved by huge investments in advanced technology. Toyota has been an industry leader in the use of multi-valve technology. This technology provides excellent performance characteristics without the necessity of additional cylinders or engine displacement. Thus, high levels of fuel efficiency and performance can be achieved.

All of Toyota's 1989 and 1990 passenger car models have multi-valve engines. Toyota's use of multi-valve engines far exceeds the level employed by any other high-volume manufacturer. Also, by 1991 all of Toyota's passenger cars and light trucks will employ multi-point electronic fuel injection.

In addition to multi-valve engines and multi-point electronic fuel injection, Toyota employs many other advanced design technologies in all passenger car and light-duty truck models. These include: 4-speed automatic transmissions, electronic automatic control transmission, overhead-cam engine designs, and low-friction and high-compression engine designs.

Toyota is not resting on its past technological advances. We have an active research program underway on all aspects of vehicle design. Some of the future technologies being studied are discussed in greater detail in our May 16, 1989 statement. As can be seen from that discussion, many of the technologies which have a beneficial impact on fuel economy have been adopted. Virtually all the remaining technologies have significant problems that must be overcome before they can be utilized on a wide-scale basis.

S. 1224 IS A SERIOUSLY FLAWED PROPOSAL THAT WOULD MARK A RADICAL DEPARTURE FROM PAST REGULATION IN THE AUTOMOBILE INDUSTRY

Turning to the specifics of S. 1224, this bill would require increases of 20% by model year 1995 and 40% by model year 2001 from each manufacturer's 1988 base CAFE level. Not only are the percentages unrealistically high, but more fundamentally, the concept of a uniform percentage increase applied to manufacturers who have employed differing levels of technology is seriously flawed. It is counterproductive to legislatively penalize the most fuel-efficient companies. Not only will this reduce competition among companies to improve fuel economy, but will prevent consumers from having a price-competitive range of products from which to choose.

S. 1224 punishes manufacturers that have made technological advances. Since, as shown above, Toyota currently employs most, and in some cases, all of the technology predicted to be available by 1995, Toyota has used up most or all of the relatively "easy" room for improvement. Those companies which have not employed these technologies for whatever reason, are rewarded by not only having to improve less than Toyota on a numerical MPG basis, but are able to make up this smaller number by coming up to the level of technology that Toyota currently uses.

S. 1224 would widen the gaps that already exist between manufacturers. Taking a given percentage increase of a higher number yields a higher MPG increase requirement than an identical percentage increase of a lower number. The 10 MPG gap that presently exists between Toyota (with a 33 MPG) and a company with a 23 MPG would be increased to a 12 MPG differential by model year 1995 under this bill.

In addition to this fundamental flaw, the new regulatory program that would be established if this bill were to be enacted would mark a radical departure from other regulation of the automobile industry. Up to this time all emission, safety and fuel economy standards have been applied to manufacturers in an evenhanded manner. Emission standards for passenger cars and light-duty trucks under the Clean Air Act are expressed in grams per mile.

This applies to all vehicles regardless of manufacturer. Vehicle safety standards under the National Highway Traffic Safety Act are performance standards that apply to all vehicles regardless of manufacturer. The theory underlying these statutes is that emission control and vehicle safety should not differ between manufacturers. This is prudent policy. On the other hand, S. 1224 would, for the first time, create separate standards for each manufacturer based on that company's current fuel-economy level.

Moreover, the manufacturer-specific standards that would result from this bill would represent a radical departure from the statutory and regulatory programs in other environmental and safety legislation. After examining the statutory language and regulatory programs established under the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Comprehensive Environmental Response, Compensation and Liability Act (Superfund), and the Occupational Health and Safety Act, we are unaware of another program that established different standards for similarly situated companies in the same industry.

The manufacturer-specific standard approach in S. 1224 would destroy the incentive for any manufacturer to do better than the applicable standard for future years. Moreover, if enacted, S. 1224 would set a very dangerous precedent in this industry, as well as for other regulatory programs, since affected companies would be wary of voluntarily performing at levels better than those specified in any law or regulation for fear that this may become the baseline for future Congressional action. This would be counter-productive to the task of cleaning the environment, promoting safety and conserving energy.

S. 1224 UNLIKELY TO ACHIEVE EXPRESSED GOALS

Proponents of the uniform percentage increase approach in S. 1224 assert that it will achieve the most fuel saving/CO_2 reduction, since all companies would be forced to increase fuel economy levels by a given percentage. Toyota believes this assertion is fallacious. Indeed, it may not achieve anywhere near the benefits intended.

The reason for this is that companies such as Toyota that have applied high levels of technology may be forced to do one of two things to achieve the high MPG increases required by this bill -- significantly downsize vehicles or apply a high degree of expensive, exotic technology. The result is likely to be that these vehicles may not be attractive to large segments of the purchasing public because they are too expensive and/or they do not provide the performance and room desired by today's consumers. These purchasers will then go to vehicles that are sized or priced where Toyota's vehicles are today, and which, under S. 1224, will be required to achieve fuel economy levels Toyota is achieving today. This forced shift will put these consumers into vehicles that get no better, and in some cases worse, fuel economy than today's Toyota vehicles. For instance, if Toyota can not meet the standard we may have to eliminate models which may be more fuel-efficient than comparably sized models still on the road. Thus, the level of benefits anticipated are not likely to be achieved.

Competition among manufacturers spurs technological innovation. Penalizing technological leaders by forcing them into a narrow market segment is antithetical to the advancement of fuel-economy technology across all segments of the industry. Congress should encourage technological innovation across all model lines. S. 1224 fails to do this.

ALTERNATIVE PROPOSALS TO UNIFORM PERCENTAGE INCREASES SHOULD BE CONSIDERED

Toyota believes broader based approaches to address energy conservation should be employed which rely on market forces to stimulate the sale of fuel-efficient vehicles. Nevertheless, if the Committee is intent on addressing CAFE separately from the broader issue of Global Warming, other alternatives are more appropriate and should be considered.

One such alternative is a size- or class-based program with percentage increases required for each vehicle class or size category. This approach would be preferable to the uniform increase approach contained in S. 1224, as all manufacturers would be forced to compete car-for-car in the categories they produce. A size- or class-based approach would drive technology across all model lines and eliminate the counter productive results associated with a uniform percentage increase. In addition, a size- or class-based program could be designed with procedures to insure significant fuel-efficiency increases while allowing companies to move among categories in response to consumer demand. Adjustments to this or other alternatives may be necessary to accommodate problems created for low-volume or very limited-line manufacturers.

Toyota believes disregarding market forces could lead to unintended results. However, if the Subcommittee is intent on changing the current CAFE program, it should do so in a way that encourages the use of the best technology across all model lines and allows the consumer to select the most efficient model in each segment -- guaranteeing fuel savings through competition.

Toyota thanks the Subcommittee for the opportunity to present its views on this important subject, and we pledge to work with the Subcommittee as it addresses issues involving fuel economy and Global Warming.

FIGURE 1

Discussion on '95 Model Fuel Economy Improvement

EEA Estimate of MY 1995

Fleet Average Fuel Economy Improvement

Technology	% F/E Gain	% Penetration Increase 1987-1995	Fleet % F/E	Toyota Cam
Front-wheel drive (includes weight reduction)	12.0	10	1.2	Adopted
6/4-cylinder/4-valve	10.0	40	4.0	Adopted
Four-speed automatic	7.5	40	3.0	Adopted
Electronic transmission control	1.5	75	1.1	Adopted
Aerodynamics II (CD = 0.34)	3.4	80	2.7	Adopted
Tires	0.5	100	0.5	Adopted
Lubricants (5W-30)	0.5	100	0.5	Not Adopte
Accessories	1.0	100	1.0	
Engine improvements				
- Overhead camshaft	6.0	10	0.6	DOHC
- Roller cam followers	1.5	80	1.2	N/A
- Low friction rings/pistons	2.0	80	1.6	Adopted
- Throttle body fuel injection	3.0	10	0.3	N/A
- Multipoint fuel injection	6.0	10	0.6	Adopted
Total			18.3	33 mpg

Source: Energy and Environmental Analysis, Inc.

FIGURE 2

DIMENSION	1978 Corolla 4-DR Sedan 5 M/T	1989 Corolla 4-DR Sedan 5 M/T	'89 vs. '78
o EPA Mileage (MPG)			
- City	28	33	+ 5
- Highway	38	45	+ 7
o Horsepower	75	90	+ 15
o Interior volume (cu. ft.)	87	95	+ 8

FIGURE 3

DIMENSION	1978 Corona 4-DR Sedan 3 A/T	1989 Camry 4-DR Sedan 4 A/T	'89 vs. '78
EPA Mileage (MPG)			
-- City	19	29	+ 10
-- Highway	23	41	+ 18
Horsepower	95	115	+ 20
Interior volume (cu. ft.)	88	101	+ 13

TOYOTA'S RESPONSE TO POST-HEARING QUESTIONS OF SENATOR BRYAN TO AUTO INDUSTRY WITNESSES

Q.1. Please state your view as to the likely trend in vehicle miles traveled in the United States. If you would project a change in vehicle miles traveled, please state the percentage by which you estimate vehicle miles traveled will change per year between the present and 2005.

Answer 1:

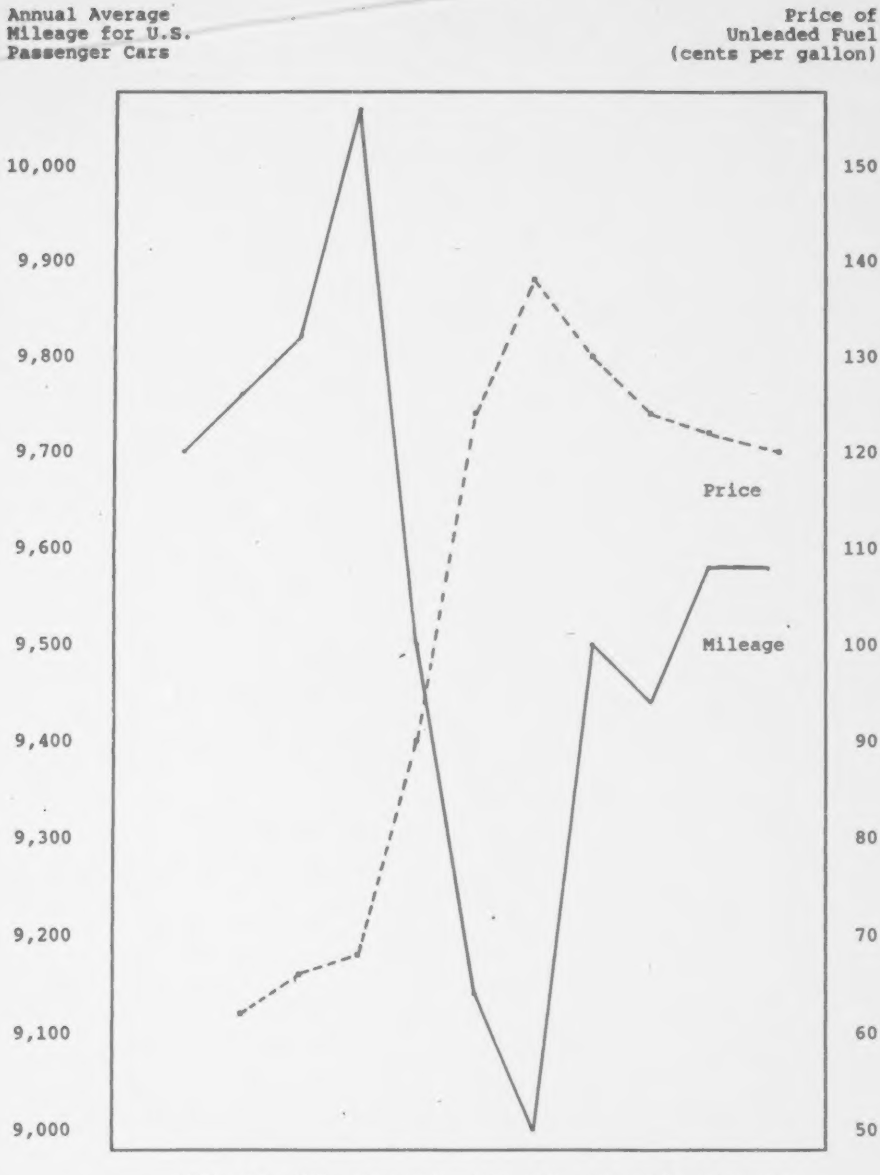
Without knowing the future price of fuel and fuel availability, it is not possible to accurately project future VMT levels. As Figure I demonstrates, VMT is directly related to the price of fuel. As fuel prices drop, annual per vehicle VMT increases, and vice versa. Thus, fuel price plays a critical role in determining whether there will be increases in VMT, and if so, how great any such increase may be.

In addition to the price of fuel, there are several other factors that will effect future VMT growth. The first is that as large metropolitan areas become more congested VMT will level off. Some of this has been seen already in very large cities in the U.S. Experience in Europe and Japan indicates that this will occur as areas become more congested. Another factor that will effect VMT growth is the demographic trend in the U.S. As the large "baby boom" generation ages, VMT from this group may decrease. In addition, new requirements in Clean Air Act amendments (see, for example, S.1630) will require VMT decreases in non-attainment areas.

For these reasons, Toyota does not project a radical change in the number of miles traveled per vehicle for the future, even if fuel prices remain relatively stable. U.S. consumers tend to have well established use patterns for vehicles such as commuting, attending school and shopping. Toyota does not forsee great changes to these use patterns. The VMT increases suggested in some of the testimony presented at the September 7, 1989 hearing appear to be quite high.

Q.2. If you project that vehicle miles traveled will increase, please state how you would propose maintaining the current status quo with respect to carbon dioxide emissions and energy consumption from the passenger vehicle sector in light of those increases.

FIGURE 1



Source: Fuel Price DOE; Mileage MVMA Data Book.

Answer 2:

As noted in the response to Question 1, Toyota is not sure the underlying premise of the question is correct. However, for purposes of responding to the Committee's inquiry, Toyota has made estimates of fuel consumption from the motor vehicle portion of the transportation segment of the U.S. economy under two different scenarios. Under the first scenario, if it is assumed that the overall new U.S. fleet fuel economy remains unchanged from existing levels and VMT increases 2% per year, fuel consumption in 2005 is estimated to be reduced nearly 12% from 1986 levels. This decrease is due to the replacement in the vehicle fleet of older, less fuel efficient vehicles with newer more fuel efficient ones. Under the second scenario, if it is assumed that there will be no increase in new U.S. fleet fuel economy from present levels and no increase in overall VMT, fuel consumption in 2005 from motor vehicles is estimated to be reduced by about 36% compared to 1986 levels.

Q.3. As you may know, the 1988 International Conference in Toronto, "The Changing Atmosphere: Implications for Global Security," adopted a goal of a 20% reduction in 1986 levels of carbon dioxide emissions by 2005. Please provide any plans you would recommend to achieve that goal for passenger vehicle carbon dioxide emissions. Include in your plan any increases you would project in vehicle miles traveled, and state what level of fuel economy you believe would be necessary to achieve that goal.

Answer 3:

As shown in the response to Question 2, without future improvement in fuel economy, and even assuming a 2% annual increase in VMT, fuel consumption is estimated to be reduced nearly 12% from 1986 levels due to replacement of older, less fuel efficient vehicles with newer, more fuel efficient vehicles.

In addition, the response to Question 1 clearly shows that VMT is directly related to fuel prices and availability. Not only is there evidence of the relationship between VMT and fuel prices and availability in the U.S. during the late 1970's and early 1980's, but also the situation that exists in Japan and Europe demonstrates this. In countries where the fuel prices are much higher than that in the U.S., the per capita VMT is much lower; while the fleet-wide CAFE in a country such as Germany is only slightly above that of the United States, according to testimony presented to the House Energy and Commerce Committee by the Office of Technology Assessment (OTA).

As to any additional reduction the Committee may believe to be necessary after accounting for anticipated replacement of less efficient vehicles with more efficient ones, we believe the issue must be considered in a broader context than CAFE alone. For this reason, Toyota suggested that a carbon fee should be explored. Such a fee would create an incentive for fuel conservation -- both for vehicle manufacturers to produce vehicles with high fuel efficiency and for consumers to purchase fuel efficient vehicles and to limit vehicle usage. A fee could also be structured to promote the replacement of older, less fuel efficient vehicles with newer, more efficient vehicles through a rebate for fuel efficient cars and a penalty for inefficient ones. In addition, programs to control VMT and ease traffic congestion, such as promotion of flextime, encouragement of carpool systems, and park and ride systems should be included.

Toyota continually strives to incorporate the latest fuel economy technology practicable in its vehicles (as evidenced by our current fleet) and will continue to do so. However, without sales incentives, market or otherwise, it will be extremely difficult to significantly improve our CAFE.

Q.4. There was discussion at the subcommittee hearing of a carbon fee or carbon tax, and such a measure was recommended by some aspects of the auto industry as a means of dealing with carbon dioxide emissions. Please provide a detailed discussion of the type of carbon fee or tax you would recommend. Include in your answer your opinion on whether the monies collected from such a fee should be earmarked for any particular purpose, such as a rebate to encourage the purchase of fuel efficient vehicles.

Q.5. Please provide your views on the effectiveness of a fee/rebate scheme that would collect fees for the purchase of vehicles with low fuel efficiency and use those fees to provide rebates as incentives for the purchase of highly fuel efficient vehicles.

Answers 4 & 5:

The following answer responds to Questions 4 and 5, which appear to us to be interrelated.

Your questions pertain to two types of fees: a carbon fee and a CO_2 fee. The merit of a carbon fee is that it would apply to all forms of fossil fuel use. The fee could be assessed either at the production stage, or at end use. In either case, there would be an incentive to conserve energy and to shift to more fuel-efficient means of energy consumption. We don't have all the answers as to how such a fee should be structured. But, to the extent it addresses fossil fuel use across all sectors of the economy, reductions in CO_2 emissions should occur.

The CO_2 fee/rebate scheme suggested during the hearing would only apply to motor vehicles. Here again, a CO_2 fee, like a carbon fee, could be applied across all sectors of the economy, resulting in significant CO_2 reductions.

As it applies specifically to vehicles, the CO_2 fee/rebate scheme seems to fit nicely with a class-based approach to CAFE by serving as a "safety net." This approach would encourage producers to provide vehicles which would not be assessed a price penalty, while at the same time financially encouraging consumers to buy fuel efficient vehicles. We will be happy to discuss these ideas with the Committee in greater detail.

Q.6. Please state what average levels of fuel economy, for both cars and light trucks, you believe your fleets will attain in 1995 and in 2001.

Answer 6:

Without knowing the price and availability of fuel, consumer demand and the overall state of the U.S. economy, we cannot give the Committee any reasonable estimate of Toyota's fuel economy level in 1995 and 2001. If, for example, fuel prices increase sharply, we would anticipate consumers purchasing more of our most fuel efficient models. This would tend to drive up our CAFE. On the other hand, if fuel prices remain fairly constant, consumer preference will make it difficult for any manufacturer to retain high CAFE levels despite the technological advances it may introduce.

Turning to S.1224, the levels contained in this bill are significantly higher than what we believe the U.S. fleet will be able to accomplish within the time frame of this bill. This is particularly true if fuel prices remain relatively constant. As our written statement points out, achieving 20% and 40% increases in CAFE for Toyota will be extremely difficult due to the high level of technology that already exists on our vehicles.

Finally, it must be noted that the recent actions in the House Health and Environment Subcommittee regarding more restrictive emission standards are likely to have a negative impact on fuel economy. The phase II emission standards contained in S.1630 would have an even greater negative impact. In addition, S.673, which was recently passed by the Senate, would result in additional vehicle weight in order to comply with this bill's more stringent vehicle safety requirements. Toyota believes it is prudent public policy to delay consideration of any modification to the CAFE program in order to consider the fuel economy impact of additional, more stringent emission and vehicle safety standards on vehicle manufacturers.

Q.7. You testified at the recent hearing of the Consumer Subcommittee in opposition to S.1224. Assuming for the purpose of this question that fuel efficiency must be improved over the next decade to the levels set by the legislation for 2001, please provide alternatives to S.1224 that you would recommend to achieve improved fuel economy at the levels established by the legislation. If you do not believe such levels are possible, please provide alternative forms of regulation or alternative levels of fuel economy that you believe are feasible and would achieve the maximum possible improvement in the fuel economy of the passenger vehicle fleet.

Answer 7:

As alluded to in previous answers, unless market based incentives are provided to spur consumers to purchase more fuel efficient vehicles, the fuel economy levels proposed in S.1224 are unrealistically high. Even with incentives, the standards in S.1224 may not be able to be achieved without a radical change in the current model mix. As mentioned in our testimony, we believe the uniform percentage increases required in S.1224 may not achieve the desired fuel economy increases. High mileage companies may be forced to eliminate fuel efficient models from the fleet, driving consumers to purchase similarly sized, less fuel efficient vehicles from lower mileage producers.

Toyota recommends a class-based approach as the best means of encouraging automakers to apply the latest fuel economy technology practicable across all model lines. A CO_2 fee/rebate program tied to a class-based approach would serve as an additional incentive to automakers to produce and for consumers to buy the most fuel efficient vehicles.

Senator BRYAN. Thank you very much, Mr. Bracken.

Senator Gore has indicated he must leave for another commitment, and I am going to defer to him first to ask questions.

Senator GORE. Mr. Chairman, thank you very much for your courtesy. I wish to apologize to the members of the next panel, a panel which includes a constituent of mine and a good friend, Jerry Benefield. I told him during the break that I have to meet with his predecessor, Marvin Runyan, who is now heading TVA. TVA is in the midst of a high stakes battle that affects our electricity consumers, and so I apologize for having to leave after this very brief round of questions.

What would you think, Dr. Whitman, of legislation requiring consumers to purchase either GM Saturns or Nissan Sentras made in Tennessee?

If you look at the fuel efficiency of those two models, we could get tremendous gains. It might be a little heavyhanded, I guess.

In any event we should be looking at ways to encourage consumer preference for cars like the Saturn and the Sentra because we are proud in Tennessee to be the location of plants that are making and will make extremely efficient automobiles.

We certainly appreciate GM's gamble on the United States making the car of the future. I know that you are well pleased with how it is going in Tennessee, and we are going to make certain that you remain that way because we have high hopes for the

Saturn and we are very pleased with what Nissan is doing just a few miles away.

I noted your call, Dr. Whitman, for a carbon dioxide fee. I have made such proposals in the past. You and I have had exchanges on that in the past, and I welcome the statement in your testimony to that effect.

I talked with a couple of the others as well. As I understand what the industry is saying, the idea of an emissions fee coupled with a rebate is something that you kind of like compared to the other alternatives, and you would like to explore that. You would like to see it applied not just to the automotive sector. I share that sentiment in spades.

I think we ought to have a carbon dioxide fee across the board. We do not yet know how to design it because it is a new idea, but I think we have to move quickly in that direction.

Where the automotive sector is concerned, I think it ought to be revenue neutral to couple it with rebates for the purchase of fuel efficient automobiles to have both a carrot and a stick, a push and a pull right in the same direction. I think by that means we might see very dramatic gains.

I am extremely concerned that the complexities of the proposal that you and I have discussed here today might delay its implementation. I think in the meantime we have to have a standard forcing measures and approaches that will ensure continued progress in forcing the technology.

I am going to try to make it back for the end of the next panel if I possibly can but, again, my apologies to members of that panel.

Thank you very much for your courtesy, Mr. Chairman.

Senator BRYAN. Thank you very much, Senator Gore.

I would like to make a general comment to the members of the industry. In fashioning this piece of legislation there was no motivation to be punitive, to be unduly harsh or unfair with the industry and certainly nothing to in any way undermine your ability to continue to survive as a major industry in our country and a very important part of our economy.

The concern is to address two issues that I think are alarming and that require more than just rhetoric. They require action. That is our increased dependency upon foreign oil and, secondarily, our increased concern about our environment and the carbon dioxide levels which are rapidly increasing and the part that the internal combustion engine plays in that role.

In establishing the standards that were put into this bill, 20 percent by 1995 and 40 percent by the year 2001, as you can gather from the testimony that has been before this subcommittee today there are those that have urged us to go beyond that. Obviously the thrust of your testimony is that those levels are not attainable.

So in working with the industry your credibility is important for those of us who want to work with you and to achieve something that is practical and workable.

Let me trace the record for a moment, however, and share with you the nature of my concern. In 1974 when this committee first considered CAFE standards, it was the testimony of General Motors, and I quote, "This legislation would have the effect of placing restrictions on the availability of five- and six-passenger cars regardless of consumer needs or intended use of vehicle. It is not only an unjustified interference with individual freedom but an extreme and unusual way for a free society to achieve its goals."

At the same hearing, Ford testified, and I quote, "This proposal would require a Ford product line consisting of either all sub-Pinto sized vehicles or some mix of vehicles ranging from a sub-subcompact to perhaps a Maverick."

Chrysler predicted that, "In effect, this bill would outlaw a number of engine lines and car models. It would restrict the industry to producing subcompact size cars or even smaller ones."

Now in marked contrast to these dire predictions, the industry did an extraordinary job. As the Chairman of this subcommittee, I commend the industry for its ingenuity and the success that attended those efforts. In effect, you doubled the fuel economy standards in a decade, and that is very, very impressive.

Rather than causing the collapse of the automobile industry as we know it, in 1988 "Business Week" reports that Ford and GM were the second and fourth highest earning companies with profits of $5.3 billion and $4.6 billion, respectively, and that Chrysler was listed as eighth in total sales with $35.5 billion in sales in that year.

I guess my question to you really is your credibility. Sitting as a new member of this committee and as a new member of Congress, why should I believe you, based upon your previous testimony?

Mr. Boltz, I will let you have the first shot at that.

Mr. Boltz. Well, perhaps we like to think of ourselves as being a bit closer to our customers, as I am sure you like to get close to your constituents. I think we heard from one of them this morning, Senator Nickles. His pleas struck some chords, as far as I am concerned, because I have heard many of the same things, many times.

Frankly, our prospects for improving fuel economy, by diffusing existing technology, maintaining present levels of performance and not downsizing the fleet, are substantially less than what would be required in S. 1224. We also see a market situation through 1995 and onward to the third millennium, (or the beginning of it, 2001) with $1-per-gallon gasoline that is unlikely to encourage further downsizing of the fleet beyond what has occurred to date.

Cars are far more fuel efficient. We have maintained, to some extent, the interior volume; the exterior volume is considerably less, and weight is considerably less.

Chrysler Corporation has diffused front-wheel drive 100 percent throughout its entire passenger car fleet. I wish I could count those fuel efficiency improvements twice, as we move onward to 1995, but we cannot.

We are already at 100 percent front-wheel drive. We offer fuel injection across our entire engine range. Some of the projections, Senator, that I think you have seen, depend on a diffusion of technologies that is virtually complete at Chrysler. I cannot speak for the industry; I can only speak for Chrysler and its capabilities.

Senator Bryan. Well, Mr. Boltz, let me interrupt you. You have given us what you have done, and I acknowledge that. The question is your predecessors, not you individually, but representing the automobile industry in the country, in effect, forecast the collapse of Western civilization as we know it in 1974. That was not your testimony, but that is it, pretty clearly. I mean, we are going to alter the American way of life; folks are not going to be able to have full-sized automobiles; everything is going to be smaller than a subcompact, is the thrust of what was said.

Now, would you not agree that those things did not occur?

Mr. BOLTZ. Yes, they did not occur. And I believe, in this instance, with the amount of CO_2 tonnage, we are looking at a serious situation. But it was not too long ago that others were forecasting a second ice age, and we are now talking about global warming.

All projections are based on the best available information that we have at the time. Frankly, sir, none of us know the future.

Senator BRYAN. It is a crystal ball that all of us have to gaze in, I agree.

Mr. BOLTZ. Our forecasts do change as better information becomes available.

Senator BRYAN. Dr. Whitman, would you not agree all of those things that were testified to by General Motors in 1974 really did not come to pass?

Dr. WHITMAN. Before I seriously address your question about credibility, Senator—I will—just let me say that this simply bears out my lifetime sense as an economist that you should never live long enough to be around when the date of your predictions comes around.

Senator BRYAN. That is true for political officials as well.

Dr. WHITMAN. But to get more serious, let me make three main points.

Senator BRYAN. But let me ask you my question, then I will allow you the three main points. But it did not occur, did it, Dr. Whitman?

Dr. WHITMAN. The exact things that you quoted did not occur, but some very significant things did occur. And that is, first of all, in the 1970s, indeed—when oil prices moved and the concerns about oil availability moved in the same direction as the CAFE requirements, indeed, the auto industry and GM made enormous increases in fuel economy. We had a 130 percent improvement. And a lot of that was due to the major shift toward front-wheel drive and downsizing. And I wish there were another such one-shot salvation in the barrel, but none of us sees it.

The only systematic studies I have seen of this phenomenon indicate, however, that it was not CAFE, but that it was the impact of fuel prices and expectations about fuel economy availability that drove fuel economy improvement. And, in fact, GM had begun the work on that downsizing significantly before the legislation was passed.

Senator BRYAN. So you are saying that GM would be where it is today even though CAFE never came into existence?

Dr. WHITMAN. Largely, yes.

Meanwhile, in the 1980s, in the last few years, since the decline in oil prices, something different has happened. GM's forecast about its CAFE turned out to be wrong. We were not able to meet the CAFE requirements and we petitioned, under the law, for a change in those standards. The reason was, frankly, at the time, because the market then—because of changes in oil prices and expectations—drove us in a different direction. And so now CAFE is indeed binding on General Motors and has significantly affected us.

And you know, I am sure, about GM's loss of market share and our fight to get it back. We have one laboratory case where we know for certain what it was that caused that loss of market share, and that is when we over-downsized our prestige luxury cars, the Seville, the Eldorado and the Toronado and the Riviera, expecting quite different oil prices than came about. And our market share in that segment went from over 50 percent to 17 percent in the space of a couple of years.

Then we changed the characteristics of those cars, an enormously expensive proposition, and we have started to regain market share. And where did the customer go? He did not go to more fuel efficient cars; he went to often less fuel efficient cars produced by producers who had not made that gamble on downsizing.

So we know very well that although many of the things you said did not come to pass, there did come to pass——

Senator **Bryan**. It was not what I said, it is what you all said.

Dr. **Whitman**. That you quoted; fair enough. What did come to pass was certainly a loss of market share on the part of the U.S. industry, partly because the forecast about energy prices and so forth did not work out the way we expected.

One final very brief comment on profits; and you cited GM's and Ford's and Chrysler's profits. And, indeed, I am happy to say that our profit record has been good in recent years, but let me say that, essentially, not one penny of that GM profit has come from the production of cars in North America. It has come from Europe, it has come from other business segments. In the long run, that is not viable. We are going to have to find ways to make money on producing North American cars if we are going to be able to meet our commitments to our employees, our stockholders and others.

Senator **Bryan**. Well, the Vice President of Finance for General Motors has spoken to the investment community, indicating that just the share of profits that you have from your overseas operations is more than enough to sustain the dividend levels that are forecast, and that has driven the price of your stock up.

Dr. **Whitman**. But I do not think you or I, Senator, would like to see a General Motors or any other U.S. car company, which only made money from things other than U.S. car production.

Senator **Bryan**. Absolutely not.

Let me shift the focus now. You have heard the testimony from some of the previous panels, expressing their concern about the increased energy dependence that we face from foreign oil supplies and the increased problem that we have from CO_2 emissions as part of a global environmental problem.

If I could just get a yes or no, Mr. Boltz, do you share those concerns, in terms of American public policy? I am asking that in the broad scale.

Mr. **Boltz**. Yes, I do. I believe that there is a basis for those concerns. I think, however, we should be very careful as we look at policy options.

Senator **Bryan**. I want to give you a chance to answer that in just one second, Dr. Whitman. Do you share those concerns of our increased energy dependence on foreign sources of oil and the global implications of increased CO_2 emissions?

Dr. **Whitman**. Clearly, we have to be concerned about the global warming issue and about the issue of energy security. The question again is we do not think that this is an appropriate response.

Senator **Bryan**. Well, let me ask you this. Now, you heard Mr. MacKenzie testify that he thought we would have to get a reduction of about 20 percent by the year, I think it was 2005. And he factored in what he thought fuel efficiency standards should be. But putting that aside, do you agree that we are going to have to reduce these emissions by 20 percent from the year 2005, based upon the increased vehicle travel miles of an expanding economy, Dr. Whitman? Or do you have a figure?

Dr. **Whitman**. Well, we would have to take a look, in detail, at Mr. MacKenzie's testimony to really analyze it. And as I remember it, the percentage increase in vehicle miles travelled, which he mentioned, was way out of sight of anything that we have estimated.

Mr. **Boltz**. I think it was three to four percent annually.

Dr. **Whitman**. But beyond that, the fact is that you cannot assume vehicle miles travelled—that you can extrapolate that on a fixed basis. For example, everything I know as an economist and all the historical record I know of suggests that if we have substantial increases in fuel efficiency you will have a larger increase in vehicle miles travelled than you would otherwise. If you have an increase in oil prices, you will get lower increases in vehicle miles travelled.

Senator **Bryan**. Sure. But without getting involved in a lot of technical razzle-dazzle, you would certainly agree, would you not, that if we have an expanding economy, we have a greater population, a larger purchase of automobiles—I hope, and I know all three of you hope that—and we are going to have more vehicle miles traveled.

Dr. **Whitman**. We will, and we will also have an increase in fuel efficiency simply from fleet turnover between now and the year 2000, in the order of 25 to 30 percent, even taking account of the likely increase in vehicle miles travelled.

Senator **Bryan**. Dr. Whitman, could you provide, and Mr. Boltz as well, what your plan would be to reduce emissions by 20 percent by, say, the year 2001. Or use any other number that you want, in terms of what you feel would be necessary to hold even the emission levels at today's standards, assuming the increased number of vehicle travel miles.

There must be some basis to project reasonably what that is going to be. You may have a different number than Mr. Boltz or a different number than Mr. MacKenzie, but I would like to frame some questions specifically to both of you and ask you if you would provide that for the committee when you get a chance to look at your data base.

Mr. **Boltz**. We certainly could. The policy options that I was about to suggest——

Senator **Bryan**. Please, let me give you that opportunity—I cut you off.

Mr. Boltz. CAFE is but one element of a national energy policy, Senator, as you well know. The vehicle miles travelled that were referenced—the CO_2 tonnage that I heard this morning—is predicated perhaps on some very significant, and perhaps high by historical standards, growth rates of vehicle miles travelled. Marina brought up the issue of a carbon fee. I think that is ultimately a large part of the equation. If conservation is the issue, I believe people would conserve fossil fuels, were there a carbon fee applied to all users of those fuels. That will have a very dramatic effect, in my view, on the rate of growth of vehicle miles travelled. I think that it would conserve fuel at an increasing rate, over time.

Yes, technology improvements are essential to aid the reduction of CO_2 emissions. We do not argue that. We are looking for a reasonable increase, consistent with our technological opportunity, and perhaps supplemented by a carbon fee. That may end up being the best policy option, sir.

Senator Bryan. Sure. And I agree that it is not mutually exclusive.

Do you agree with the concept that Senator Gore and I think Senator Kerry were discussing, that there be some kind of a carbon tax; that it be revenue neutral, and that there be some rebate given to those purchasers of more fuel efficient automobiles?

Mr. Boltz. As a general concept, in talking about carbon fees, I would support it, if that is what Senator Gore is talking about. I think there are ways to be far more direct, with perhaps far lower transaction costs, than such a scheme might involve. A simple carbon fee, to me, seems like a very simple and direct approach.

Senator Bryan. Maybe you could embellish upon that in terms of response to some questions, Mr. Boltz.

Mr. Boltz. I would be happy to.

Senator Bryan. Dr. Whitman.

Dr. Whitman. Well, again, as I said in my testimony, I think we need a serious national discussion of this. I am not prepared to say now—I think there are a lot of questions that have to be answered. I think we have to understand exactly what we are talking about, what some of the implications would be, what some of the tradeoffs would be. This is the beginning, not the end of a discussion.

Clearly, we are taking this whole question very seriously. To my regret, I am missing the second day of a two-day conference that GM is holding right now on global warming, including our top management and technical and operating people, in order to learn more about the subject from outside experts, in order to explore among ourselves what the range of response options is, and in order to focus our attention on this issue. So we are taking it very seriously.

This is an enormous input of time and energy and it is just the beginning. As I say, I think that is an area which needs to be explored. I think the point is that if you are going to have policies in this area, if this is what the national interest requires, you want to make sure these policies are effective and that they are efficient and they are fair.

We do not think CAFE is any one of those three. We think that this other possibility opens up the possibility of actions which would stand much higher by those three criteria.

Senator **Bryan**. Is CAFE part of that strategy?

Dr. **Whitman**. As I have said before, Senator, I do not believe that CAFE can be fixed. I believe that the fundamental concept of that kind of command and control notion, where you try to get at consumers through producers, does not work.

Senator **Bryan**. So you are saying whatever that broad strategy is, CAFE really does not, from your point of view, play any role at all?

Dr. **Whitman**. That is right.

Senator **Bryan**. Thank you, Dr. Whitman.

Mr. Bracken, I did not mean to ignore you, but we did not have the benefit of your testimony in 1974.

Would you care to comment or make a point on anything that we discussed here, that you either in response to a question I had or a comment?

Mr. **Bracken**. I would like to make two points. First, like the people to my right we are concerned about CO_2 and energy security. That is a concern for all of us.

Second, we are primarily concerned about the concept incorporated in S. 1224. It is just not fair that we are going to be forced to go up a same percentage as others when we are already at a high level. And it would be very difficult for us to do that. We may not be able to sell certain fuel efficient vehicles because they may be too expensive or might not provide the performance desired by today's consumers. While at the same time our competitors would be selling similar sized vehicles, which may have lower fuel economy than the ones we took out of that market.

Senator **Bryan**. Mr. Bracken, we thank you very much for your testimony.

Thank you, Dr. Whitman, Mr. Boltz. I appreciate it. If you could respond to some additional questions that members of the subcommittee might have and give you a chance to expand a little bit on a couple of those points that I cut both of you off on in the interest of time.

Dr. **Whitman**. We will be glad to, Senator.

Senator **Bryan**. Thank you so very much.

Our next and our last panel consists of Ms. Helen Petrauskas, Vice President, Environmental and Safety Engineering, Ford Motor Company; Ms. Toni Harrington, Honda North America, Inc.; Mr. Jerry L. Benefield, President, Nissan Motor Manufacturing Corporation USA; and Mr. Earl Landesman, Principal of A.T. Kearney, Inc.

Welcome to the panel.

STATEMENT OF HELEN O. PETRAUSKAS, VICE PRESIDENT, ENVIRONMENTAL AND SAFETY ENGINEERING, FORD MOTOR CO.

Ms. **Petrauskas**. Thank you, Mr. Chairman.

I have a short statement that I would like to make, and I ask that our full statement be considered for the record.

Senator **Bryan**. Certainly. Your full statement will be made a part of the record.

Ms. **Petrauskas**. Ford appreciates the opportunity to comment on proposed fuel economy legislation.

There have been a number of recent developments that are important to the consideration of this issue that have occurred since the last time we testified before this Committee.

The administration has proposed new and very demanding exhaust emission standards that are at the limit of projected feasibility and has also proposed a major alternative fuels program. Ford is taking action today in order to insure that our future model year vehicles can, in fact, meet these requirements.

NHTSA has proposed substantial new safety standards for cars and light trucks and, again, we are not waiting for proposals to be finalized. We are taking action today to assure that when the proposals are final, our products will, in fact, meet them.

Legislation has been proposed that would require the phase-out of chlorofluorocarbons, CFC usage. Here again, we have been at work for some time targeting to eliminate CFCs at the earliest opportunity, when a safe substitute material is available.

Both DOE and DOT have announced they are formulating national energy and national transportation strategies, and we are participating, we hope meaningfully, in that effort.

Meeting new emission, CFC and safety regulations, as well as responding to increased customer interest in safety features, will require substantial industry resources and efforts, and they will reduce fuel economy.

We would hope that DOT's and DOE's efforts will look at transportation policy and transportation efficiency in a broad context that considers the interrelationship with these other policy goals.

While S. 1224 addresses many of the inequities of the present CAFE regulations, the fuel economy standards in S. 1224 are far beyond levels that can reasonably be projected for full line manufacturers. They appear to be based on, and, in fact, exceed projections of potential fuel economy improvement capability developed by a contractor for the Office of Technology Assessment and DOE.

Applying the same technologies used in these studies, Ford can project an average fuel economy improvement of about one-half of that estimated.

Part of the difference in the two assessments is that some of the technology benefits cannot be matched on all vehicles. Also, some of the benefits attributable to these technologies are not additive, as assumed in the study.

In addition, in some cases, Ford has already incorporated identified technologies to a greater extent than assumed in the OTA baseline and, therefore, there is less potential for future improvement.

An example of that would be the fact that for today's Ford cars, approximately 85 percent of them are equipped with electronic fuel injection. The OTA study projects a 55 percent usage by 1995.

I might add, Mr. Chairman, that we do not say these things as criticism of the OTA study because many of the things that I have noted OTA itself has identified as elements of its study.

In a letter to this Committee, OTA noted that manufacturers would not be able to meet the 1995 improvement projection because of changes in the baseline fleet that have occurred since the analysis was performed and that an earlier projection of a 36 percent improvement capability is no longer valid.

S. 1224 would set similar percentage improvements for trucks. Yet, many of these same technologies provide even smaller benefits on trucks than can be achieved on passenger cars or simply are not applicable because of the basic truck functional requirements.

In summary, these analyses overstate what we believe is possible with the application of new technology. As a result, if the standards in S. 1224 are adopted, the inevitable result would be a significant reduction in vehicle size and utility.

Progress on automotive fuel economy will continue with or without new regulations. Fuel economy continues to be a competitive factor among vehicles providing similar function and performance. The industry will incorporate new technologies that will make incremental improvements in the fuel economy of our products.

In closing, I would just say that in articulating either a greenhouse warming policy or an energy policy, we would urge that consideration be given to an international carbon fee, to the potential role that alternative fuels, i.e. fuels other than petroleum-derived fuels, may provide, and, finally, the relationship of our energy policy to other, very important, national goals.

Thank you, Mr. Chairman.

[The statement and questions and answers follow:]

Statement of Helen O. Petrauskas
Vice President, Environmental and Safety Engineering, Ford Motor Company
Before the Senate Commerce Science and Transportation Committee
Subcommittee on the Consumer
September 7, 1989

Mr. Chairman, Ford appreciates the opportunity to comment on proposed legislation that would increase Corporate Average Fuel Economy (CAFE) standards.

Since our last testimony on CAFE before this committee, there have been a number of developments that are important to the consideration of this issue.

- The Administration's clean air bill has been introduced in the Congress. The bill proposes new and very demanding environmental requirements for cars and trucks, including: 1) exhaust emissions standards that are at the limit of projected feasibility, 2) significant controls on evaporative emissions and running losses, and 3) a major alternative-fuels program. Ford is taking actions now to help ensure that its future products will be able to meet these challenging new requirements.
- NHTSA has proposed new side-impact performance standards for cars and light trucks and extending certain existing car safety standards, including roof crush and head restraints, to light trucks. Ford is working to incorporate these requirements in its new products and to offer additional new technologies where we believe there are safety benefits for consumers.
- Legislation has been proposed that would require the phase out of chlorofluorocarbon (CFC) usage. Ford plans to phase out the use of CFCs as soon as substitutes are available.
- The Department of Energy (DOE) has announced plans to develop a National Energy Strategy and the Department of Transportation (DOT) is formulating a National Transportation Policy. Ford is participating in both studies.

Meeting new emissions, CFC and safety regulations -- as well as responding to increased customer interest in safety features -- will require substantial industry resources and efforts. Unfortunately, efforts to meet most of these requirements probably will result in reduced vehicle fuel economy because of the inherent conflict between emissions and fuel economy and the added weight resulting from CFC and safety regulations. We would hope that DOT and DOE's efforts will look at transportation efficiency in a broad context that considers its interrelationship with these other national policy goals.

In previous testimony, Ford pointed out the inequities and anticompetitive impacts of the present CAFE mechanism (Attachment I). We suggested that if Congress believes fuel economy increases are necessary, setting an equal percentage task for all manufacturers would be more equitable and would result in all manufacturers contributing to energy conservation.

S.1224 attempts to address some of the concerns we raised by setting equal percentage improvement standards for each manufacturer. Also, it would set standards for 1995 and 2001 with no interim year-by-year increases, which would allow product changes to be made in a more resource-efficient manner.

However, the fuel-economy standards in S.1224 are far beyond levels that can reasonably be projected for full-line manufacturers. They appear to be based on -- and in fact exceed -- projections of potential fuel economy improvement capability developed by a contractor for the Office of Technology Assessment (OTA) and the DOE.

For cars, the contractor estimated that industry could achieve a 17 percent fuel economy improvement by the 1995 model year using "off the shelf" technologies. We have evaluated the benefits of applying these technologies to the Ford fleet, which we are providing for the record. Ford projects its average fuel economy opportunity to be about one half of that estimated by OTA if we were to apply the technologies to the extent identified by OTA (Attachment II).

Part of the difference in the two assessments is explained by the fact that some of the technology benefits identified by OTA -- which were based on limited data -- cannot be matched on all vehicles. Also, some of the benefits attributable to these technologies are not additive, as assumed in the study. For example, to achieve OTA/DOE projected fuel economy benefits for four-valve engines requires the use of overhead cam technology. Yet overhead cam technology is listed as having additional improvement potential. In addition, in some cases Ford already has incorporated identified technologies. For example, today 85 percent of our cars are equipped with fuel injection in contrast to the 55 percent use of fuel injection projected for 1995. As a result, there is less potential for additional future improvement for Ford.

In a letter to this committee, OTA noted that manufacturers would not be able to meet the 1995 improvement projections because of changes in the baseline fleet that have occurred since the analysis was performed. OTA also noted that its estimates related to the industry as a whole and did not take into account specific manufacturer capability. With regard to the 2001 goal, OTA stated that an earlier OTA assessment of a 36 percent improvement capability represents "a theoretical accelerated technology case that would have involved a major disruption to the industry's product development schedules..." and that "it is now essentially impossible to achieve because of time limitations."

S.1224 would set similar percentage improvements for trucks. Yet many of these technologies provide even smaller benefits on trucks than can be achieved on passenger cars, or are simply not applicable because of basic truck functional requirements. For example, four-valve engines produce more horsepower at high engine speed than two-valve engines of comparable or larger displacement. On cars, this often allows manufacturers to reduce engine displacement, resulting in improved fuel economy. It is difficult to translate this improvement to trucks, however, because four-valve engines have reduced low-speed torque, which is essential for load-carrying capability and gradeability. Also, applying front-wheel-drive technology is not practical for those trucks designed to carry heavy loads over the rear wheels because the heavy loads reduce front wheel traction.

In summary, these analyses overstate what is possible with the application of new technology. As a result, if the standards in S.1224 are adopted, the inevitable result would be a significant reduction in vehicle size and utility.

Further, as acknowledged by OTA, the fuel economy improvements assumed in S.1224 do not take into account uncertainties such as customer acceptance, market factors, or changes in other standards that can reduce manufacturer's ability to meet the standards. We are concerned that S.1224 prohibits DOT from making any adjustments to the standards during the 1995-2000 period for these or any other reasons.

Before taking any steps to set new fuel economy regulations, it is important to look at the goals such regulations seek to address. S.1224 cites global warming and energy security as the legislation's primary focus.

Increasing CAFE, however, does little to address global warming problems. The most important contribution the automotive sector can make to reducing global warming gases is to phase out the use of chlorofluorocarbons (CFCs). As noted earlier, Ford plans to phase out the use of CFCs as soon as substitutes are available -- probably by the mid-1990s -- but all auto manufacturers are dependent on suppliers, who must develop environmentally-acceptable substitutes and put in place new production capacity.

Carbon dioxide (CO_2) -- the other major global warming gas -- requires a coordinated international approach. Higher fuel economy standards can contribute only modestly because CO_2 emissions from U.S. vehicles -- cars, trucks and buses -- account for only 2.5 percent of all global warming gases (Attachment III). Even doubling the fuel economy of all cars on the road can reduce the buildup of global warming gases by about half of one percent.

On the other hand, an international carbon fee collected on the production of all carbon-based fuels could have a major impact on CO_2 emissions.

Energy security involves questions much broader than the automotive sector, such as:

- Are we using the right fuels for each application?
- Are there alternative fuels that make sense for some applications? The use of alternative fuels could help preserve personal mobility in the transportation sector, while reducing petroleum dependency.
- Are the right incentives in place -- in terms of which type of transportation consumers use, how much and which type of fuel? Focusing only on the product cannot assure the attainment of national goals -- for example, in the auto sector, consumers have taken advantage of improved fuel economy and lower gasoline prices to drive more miles.

Such questions are likely to be addressed by the DOT and DOE studies.

Progress on automotive fuel economy will continue -- with or without new regulations. Fuel economy continues to be a competitive factor in the market among vehicles providing similar function and performance. And the industry will incorporate new technologies that will make incremental improvements in the fuel economy of our products.

But requirements that go beyond technical and market realities will result in a loss of vehicle function and personal mobility for American consumers. Moreover, higher CAFE standards will divert industry resources from work on other national goals. In these circumstances, we urge the Committee not to take action on legislation that would increase fuel economy standards.

Attachment I

Problems with CAFE

- Can put manufacturers at odds with market
- Disadvantages domestic manufacturers
- Not automatically adjusted for effects of other regulations

There are three major problems with the way CAFE works today:

- With the decline in gasoline prices, consumers have chosen size and functional attributes over fuel economy.
  - In 1981, when gasoline was $1.60 a gallon, 86 percent of new car buyers said that fuel economy was extremely or very important in their purchase decision. In 1988, gasoline was 93 cents a gallon and only 74 percent ranked fuel economy that highly.
  - As a result, CAFE has declined despite the introduction of fuel economy technology. Since 1985, we estimate we have lost 1.5 mpg of car CAFE due to changes in consumer preferences -- for larger cars, larger engines and performance and comfort. Similar changes have affected the truck fleet, as relatively more consumers have opted for full-size trucks and vans equipped with larger engines.
- The fleets of most foreign-based manufacturers are largely comprised of small cars -- so they can meet present or even higher CAFE standards with relative ease.
  - The only way that domestic manufacturers can sell larger cars and trucks and still meet CAFE is to sell enough smaller vehicles to offset the CAFE effect of the larger ones.
  - This puts us at a competitive disadvantage in two ways: 1) we must sell higher volumes of small cars -- where foreign manufacturers are most competitive; and 2) when CAFE is binding, we must either ration or restrict larger vehicle production, while the Japanese can enter these markets without worrying about CAFE.
- Although EPCA says that DOT must take into account the effect of emissions and other standards when setting CAFE standards, there is no specific mandate to adjust the CAFE standards when other requirements take effect that reduce fuel economy.
  - New safety and emission requirements are likely to have a substantial impact on CAFE.

OTA VERSUS FORD
ASSESSMENT OF TECHNOLOGY FUEL ECONOMY BENEFITS

Fuel Economy Technology	Average Vehicle Fuel Economy Gain OTA (%)	Ford (%)
Front Wheel Drive	12.0	2.0
4/6-Cylinder/4-Valve Engine	10.0	3.0
4-Speed Automatic	7.5	3.0
Electronic Transmission Control	1.5	0.5
Aerodynamics (13% Reduction)	3.4	3.0
Tires	0.5	0.5
Accessories	1.0	1.0
Engine Improvements		
• Overhead Cam	6.0	1.0
• Roller Cam	1.5	3.0
• Low Friction Rings/Pistons	1.5	1.0
• Throttle Body Injection	3.0	3.0
• Multipoint Fuel Injection	7.0	1.0

Net Projected Benefit:

- OTA Estimated Improvement (1987-95) 17%*
- Net OTA Opportunity Adjusted for Ford Estimate of Technology Benefit (1989-95) and Ford 1989 Penetration 8%*

The above analyses do not include the effects of market acceptance, mix, other federal standards and the need to achieve satisfactory product attributes (e.g., driveability, gradeability, performance, etc.).

* Note: Net is sum of products of fuel economy gains and penetrations.

Attachment II
Page 2 of 2

GENERAL DISCUSSION

The OTA analysis evaluates the capability of the U.S. new car fleet to achieve improvements in fuel economy. While some of the estimates appear reasonable, the methodology is inconsistent with some recent fuel economy data from EPA and ignores capabilities of individual manufacturers and potential adverse effects of clean air and safety requirements.

OTA PROJECTS A 17% FLEET IMPROVEMENT 1987-1995; FORD TECHNOLOGY LEVELS IN 1989 AND USE OF MORE REALISTIC ESTIMATES FOR THE BENEFIT OF 1995 TECHNOLOGY REDUCE THIS TO 8%

Technology benefits are projected for front wheel drive, multivalve engines, improved transmissions, aerodynamics, tires, accessories and other engine improvements. The major differences are found in the assumed benefit of multivalve engines, FWD, lock-up transmissions, electronic transmission control, OHC and multipoint fuel injection engines.

FWD - The 12% difference for FWD is based on early 1980's model replacements in which many parameters changed. Ford does not recognize FWD as a fuel enhancing technology, but rather as an opportunity to obtain package efficiency and possibly weight reduction in the mid-size and smaller vehicles. It is the weight reduction which may produce increased fuel economy of about 2%. Without weight reduction, no net fuel economy benefit is derived.

MULTIVALVE - Based on normalized 1989 EPA data for 2-valve and 4-valve technology with overhead cam, we find that the average fuel economy improvement is 3% for equal performance engines using multipoint fuel injection.

4-SPEED LOCK-UP AUTOMATIC TRANSMISSIONS - The average improvement shown in the EPA test car data for model years 1988-90 between lock-up 3-speed versus 4-speed automatic transmissions is 3%. Lock-up alone on a 3-speed yields 2%.

ELECTRONIC TRANSMISSION CONTROL - Based on our Corporate Vehicle Simulation Program we are within 0.5 mpg of the optimum shift strategy on most of our powertrains. The recoverable portion of this due to driveability constraints is judged to be .1 to .2 mpg which translates to a potential fuel economy gain of 0.5%.

OVERHEAD CAM - The fuel economy benefits of overhead cams can result from improved idle combustion or reduced friction. This benefit is estimated at 1%, but is not additive to the mutivalve benefit (required for overhead cam).

ROLLER FOLLOWER - The benefit is assessed to be 3% for OHV, SOHC and DOHC.

MULTIPOINT FUEL INJECTION - Based upon the data developed for adding fuel injection to Ford's 4.9L, 5.0L and 5.8L engines we found the following:

Non-Feedback Carburetor → Feedback Carburetor - 3%
Feedback Carburetor → Throttle Body Injection - 3%
Throttle Body Injection → Multipoint Injection - 1%
Total - 7%

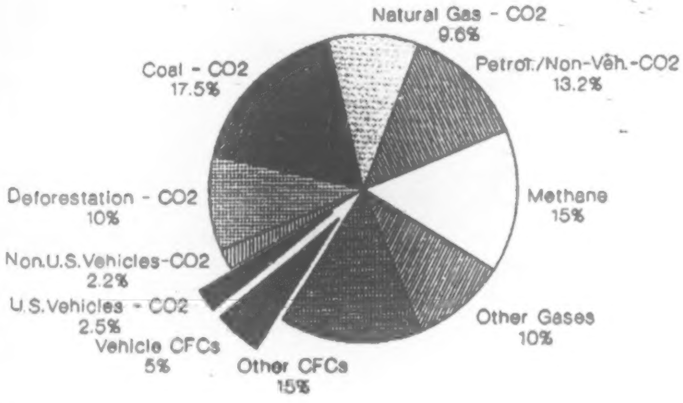
Using Ford's analysis of EPA fuel economy data to derive the benefit of the same OTA technologies, produces a lower benefit of 8.3%, without consideration of feasibility, practicability nor the affects of other requirements.

otarev.wp

September 1, 1989

Attachment III

Worldwide Contributors to Global Warming



Sources: International Panel on Climate Change and EPA

Ford

Helen O. Petrauskas
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P. O. Box 1899
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October 16, 1989

Dear Mr. Chairman:

Thank you for the opportunity to express our views at the September 6, 1989 hearing on S. 1224. We have enclosed, with this letter, our answers to the questions included in your September 18, 1989 correspondence.

At the hearing, a number of suggestions were made to improve the CAFE mechanism. Despite these efforts, there are several underlying aspects of the CAFE mechanism which will do little to encourage fuel efficiency and much to disadvantage full line manufacturers. Because the law requires sales-weighted averaging of all products, compliance will be complicated any time that market factors cause product, powertrain or option mix to shift from that used to establish the standards.

Moreover, CAFE standards require forecasts of product acceptance and technological improvements -- clearly, such estimates have been wrong in the past and, as we demonstrated in our testimony, could be wrong in the future. To the degree that such estimates overstate capability, adjustments that attempt to provide an equal task for all manufacturers will merely provide inequities for all. While this reduces the disadvantage to U.S. manufacturers, it will not ensure a proper goal or allow for administrative responsiveness when real world conditions differ from those used to construct the goal.

For its part, Ford plans to increase the fuel economy of its product as rapidly as possible for competitive reasons, whether or not the CAFE standard remains at 27.5 mpg.

Further, we plan to phase out the use of CFCs as quickly as technology and substitutes will permit. CFCs have much more significance in terms of potential global impact than CO_2. In fact, three discharges of the vehicle air conditioner have more impact than 100,000 miles of CO_2 emissions. Thus, we believe our accelerated schedule for CFC replacement will produce greater and more cost-effective benefits than would new CAFE standards.

Again, thank you for the opportunity to provide this information.

Sincerely,

Helen O. Petrauskas

H. O. Petrauskas

Enclosure

The Honorable Richard H. Bryan
Chairman, Consumer Subcommittee
Committee on Commerce, Science and Transportation
United States Senate
Washington, DC 20510-6125

POST-HEARING QUESTIONS OF SENATOR BRYAN TO AUTO INDUSTRY WITNESSES

Q.1. PLEASE STATE YOUR VIEW AS TO THE LIKELY TREND IN VEHICLE MILES TRAVELED IN THE UNITED STATES. IF YOU WOULD PROJECT A CHANGE IN VEHICLE MILES TRAVELED, PLEASE STATE THE PERCENTAGE BY WHICH YOU ESTIMATE VEHICLE MILES TRAVELED WILL CHANGE PER YEAR BETWEEN THE PRESENT AND 2005.

Q.2. IF YOU PROJECT THAT VEHICLE MILES TRAVELED WILL INCREASE, PLEASE STATE HOW YOU WOULD PROPOSE MAINTAINING THE CURRENT STATUS QUO WITH RESPECT TO CARBON DIOXIDE EMISSIONS AND ENERGY CONSUMPTION FROM THE PASSENGER VEHICLE SECTOR IN LIGHT OF THOSE INCREASES.

A.1. & A.2. Total vehicle miles traveled (VMT) -- the total number of miles accumulated by U.S. passenger cars -- has increased an average of about 2.5% per year from 1980 to 1987; average VMT -- the number of annual miles by the average vehicle -- has increased, on average, less than 1% during that same period.1/ Coincidentally, the average fuel economy of all on-road passenger cars has increased more than 3.5% per year, yielding an average reduction in the total fuel consumed by these vehicles. It is expected that average vehicle miles travelled (VMT) will continue to rise as long as low fuel prices and good economic conditions continue. Further, urban sprawl, extended/improved urban roadway systems, expansion of the number of shopping centers and many other factors associated with the American life style, will exacerbate the trend. Given the present indicators, we expect the current growth in average VMT to continue through the mid-1990s, with some potential for leveling thereafter. The trend in total VMT, which is also dependent upon the total number of passenger cars registered in the U.S., is likely to continue at the same rate as long as the number of working family members and total population increase. Fuel consumption, however, is also affected by congestion, road conditions, vehicle acceleration/speed, maintenance, VMT and a number of additional factors. For example, turnover of the fleet, replacing older, less fuel-efficient vehicles with new vehicles, may serve to moderate total fuel consumption. While we expect ongoing improvements in technology and vehicle efficiency, it is impractical and misleading to assume that the efficiency of the automobile can be changed sufficiently to offset all of these trends.

Regarding potential future actions that can be taken to offset this growth in VMT, transportation control measures could further reduce both VMT and consumption. Measures worth considering include car-pooling incentives, improved traffic flow to eliminate congestion, special highway lanes for large trucks, and mass transit. However, we believe that a carbon fee and transportation control measures will be most effective. The carbon fee is discussed in the response to Question #4. Basically, placing a fee on energy consumption would result in a reduction in the number of miles driven per vehicle owner and in a shift to more fuel-efficient vehicles. The extent to which these actions would follow, as well as the degree to which other economic factors are impacted, depends on the magnitude of the carbon fee.

1/ Reference: Highway Statistics Summary to 1985 Table VM 201A; Highway Statistics 1987 Table VM1; U.S. DOT Federal Highway Administration.

Q.3. AS YOU MAY KNOW, THE 1988 INTERNATIONAL CONFERENCE IN TORONTO, "THE CHANGING ATMOSPHERE" IMPLICATIONS FOR GLOBAL SECURITY," ADOPTED A GOAL OF A 20% REDUCTION IN 1986 LEVELS OF CARBON DIOXIDE EMISSIONS BY 2005. PLEASE PROVIDE ANY PLANS YOU WOULD RECOMMEND TO ACHIEVE THAT GOAL FOR PASSENGER VEHICLE CARBON DIOXIDE EMISSIONS. INCLUDE IN YOUR PLAN ANY INCREASES YOU WOULD PROJECT IN VEHICLE MILES TRAVELED, AND STATE WHAT LEVEL OF FUEL ECONOMY YOU BELIEVE WOULD BE NECESSARY TO ACHIEVE THAT GOAL.

A.3. Ford is prepared to do its part to reduce any potential for increases in global warming gases. It is important, however, to understand the role of the automobile to total global warming before determining whether specific courses of action would be beneficial -- particularly when unrealistic goals for one or more sectors can induce major dislocations.

While it is estimated that CO_2 from fuel combustion contributes about 45% to global warming enhancement (about another 10% is due to CO_2 from deforestation), petroleum consumption from highway vehicles contributes only about 4.7% of global warming enhancement. Thus, it is estimated that doubling the fuel economy of U.S. passenger cars alone starting from an assumed base of 26.5 mpg fleet to a 53 mpg fleet would result in only about a 0.5% reduction in global warming gases. Moreover, thorough studies are needed to determine the degree to which each global warming gas can be reduced technologically, practically and economically. Such an approach, combined with an understanding of the relative impact of each gas, would allow ranking of the most cost beneficial goals. We believe translation of a 20% task to all CO_2 sources is not an effective approach to such a complex problem. Nevertheless, our efforts will continue to improve the fuel economy of our new products, thus reducing the CO_2 emissions. However, new U.S. regulations mandating extremely high CAFE standards, would do little to reduce potential global warming.

CFCs are the second most important greenhouse gases in terms of their contribution to global warming, accounting for about 20% to 25% of global warming. In addition, each molecule of CFC-12 (used in mobile source air conditioners) has 30,000 times higher greenhouse potential than a molecule of CO_2. Thus, typical usage of an air conditioner containing a 4-liter charge of CFC-12 and requiring two charges over the vehicle lifetime, adds as much to the greenhouse warming as all the CO_2 emitted from an average, new vehicle driven for 100,000 miles.

Based on the above information, coupled with the fact that mobile source A/C accounts for about 23% of total U.S. CFC usage (mobile sources use additional CFCs for flexible foams manufacturing and solvent usage), the single most important action that the automobile industry can take is the total elimination of CFCs as expeditiously as possible. Ford has already begun this process and will continue to eliminate CFCs as safe substitutes become available.

Q.4. THERE WAS DISCUSSION AT THE SUBCOMMITTEE HEARING OF A CARBON FEE OR CARBON TAX, AND SUCH A MEASURE WAS RECOMMENDED BY SOME ASPECTS OF THE AUTO INDUSTRY AS A MEANS OF DEALING WITH CARBON DIOXIDE EMISSIONS. PLEASE PROVIDE A DETAILED DISCUSSION OF THE TYPE OF CARBON FEE OR TAX YOU WOULD RECOMMEND. INCLUDE IN YOUR ANSWER YOUR OPINION ON WHETHER THE MONIES COLLECTED FROM SUCH A FEE SHOULD BE EARMARKED FOR ANY PARTICULAR PURPOSE, SUCH AS A REBATE TO ENCOURAGE THE PURCHASE OF FUEL EFFICIENT VEHICLES.

A.4. A carbon fee could be implemented as a simple and direct economic incentive program to deal with global warming. Carbon fees would be broad based, would apply to all first domestic sales of fossil fuels (coal, petroleum, natural gas), and would be levied in direct proportion to each fuel's carbon content per energy unit. Ford believes that the use of a carbon fee may offer promise in reducing consumption of petroleum, as discussed in response to Question 3 above. However, we are unable, at this time, to suggest specific uses for such fees collected. We believe that such fee concepts and related issues require more detailed study before recommendations are provided.

Q.5. PLEASE PROVIDE YOUR VIEWS ON THE EFFECTIVENESS OF A FEE/REBATE SCHEME THAT WOULD COLLECT FEES FOR THE PURCHASE OF VEHICLES WITH LOW FUEL EFFICIENCY AND USE THOSE FEES TO PROVIDE REBATES AS INCENTIVES FOR THE PURCHASE OF HIGHLY FUEL EFFICIENT VEHICLES.

A.5. We have serious reservations about any fee and rebate mechanisms to discourage the purchase of "low fuel efficiency" vehicles and encourage purchase of high fuel efficiency products. Such schemes seldom are able to consider the functional needs of each purchaser. For a family of five or six, the full-size or mid-size sedan, station wagon or similar vehicle would provide the most efficient and practical transportation, particularly versus two smaller vehicles. Similarly, commercial transportation vehicles, cargo-carrying needs, cross-use of vehicles (i.e., for both business and private application), and a variety of factors dictate the need for the relative size of cargo-carrying and passenger-carrying volume. We know of no equitable scheme to tailor a fee/rebate mechanism to consider such requirements. However the use of a carbon fee would encourage more appropriate purchase and use of the products which consume the fuel.

Additionally, this scheme could have a disparate impact on full-line manufacturers and provide subsidies to small-car manufacturers financed by full-line manufacturer sales.

Q.6. PLEASE STATE WHAT AVERAGE LEVELS OF FUEL ECONOMY, FOR BOTH CARS AND LIGHT TRUCKS, YOU BELIEVE YOUR FLEETS WILL ATTAIN IN 1995 AND IN 2001.

A.6. As stated in our prior response, prediction of future fleet average fuel economy is primarily dependent upon the assumptions one uses for product mix, technological implementation and achievement, and the effect of other federal standards. History has shown that few predictions are completely accurate -- technological opportunities often diminish as more complete information and external factors are considered. Early 1980 forecasts of the manufacturer-specific mix of small products have been proven excessive as fuel prices have declined and more small, compact products have entered the marketplace.

Typically, compliance has then required restriction or elimination of products if the standard is not corrected for the errant assumptions. Thus, we believe that the CAFE standards, even if modified, provide rigid, often unrealistic, goals. Achievement of such are far too dependent upon factors beyond the control of the manufacturer. For example, Ford offered diesel engines in several car lines, but was forced to drop them due to low market demand. However, assuming no change in customer demand, accurate forecasts of safety and emission requirements, and proper estimates of technological benefits, 1995 passenger car fuel economy would improve by 1 to 2 mpg over current levels. In the same time period, light trucks would increase by only about 0.5 to 1 mpg due to the limitations caused by truck functional considerations. We must note that lead time and current product replacement cycles preclude major changes in those plans.

Product plans for 2001 are not clear at this time, and prediction of fuel economy levels is less clear. While we plan to continue to make product improvements, we are not able to predict customer demand, regulatory requirements and external factors, such as fuel price and availability ten years in the future. DOE has estimated the potential fleet improvement which can be achieved by "cost effective" acceleration of current and emerging technologies. Without consideration of the applicability or appropriateness of the penetration rates listed for those technologies, the use of what we believe to be more realistic fuel economy benefits yields about half of the improvement projected by the Department. We have scheduled meetings with DOE in hope of reconciling this aspect of the analysis.

Q.7. YOU TESTIFIED AT THE RECENT HEARING OF THE CONSUMER SUBCOMMITTEE IN OPPOSITION TO S. 1224. ASSUMING FOR THE PURPOSE OF THIS QUESTION THAT FUEL EFFICIENCY MUST BE IMPROVED OVER THE NEXT DECADE TO THE LEVELS SET BY THE LEGISLATION FOR 2001, PLEASE PROVIDE ALTERNATIVES TO S. 1224 THAT YOU WOULD RECOMMEND TO ACHIEVE IMPROVED FUEL ECONOMY AT THE LEVELS ESTABLISHED BY THE LEGISLATION. IF YOU DO NOT BELIEVE SUCH LEVELS ARE POSSIBLE, PLEASE PROVIDE ALTERNATIVE FORMS OF REGULATION OR ALTERNATIVE LEVELS OF FUEL ECONOMY THAT YOU BELIEVE ARE FEASIBLE AND WOULD ACHIEVE THE MAXIMUM POSSIBLE IMPROVEMENT IN THE FUEL ECONOMY OF THE PASSENGER VEHICLE FLEET.

A.7. Ford will continue its efforts in earnest to achieve incremental improvements in vehicle fuel economy. Recognizing that any level of improvement will have only minimal effect on global warming, we will press for rapid elimination of CFCs. CFC elimination, carbon fees, and transportation control measures represent the most effective means of reducing the mobile source contribution to global warming.

We believe that the CAFE standards served a purpose in the early 1970s when fuel prices were controlled and not reflective of the world value of crude oil. When imported small cars had not yet gained in popularity, we were encouraged to prepare for production of such vehicles. On the other hand, today's competitive pressures require ongoing advancement in technology/fuel efficiency, quality and reliability. Today, Ford offers a full spectrum of fuel efficient products -- all downsized from the 1970s. We have set a goal to seek continuous improvement in these attributes.

As a consequence, we believe that modifying and then increasing the standards within the current law will only serve to perpetuate significant dislocations within the industry. The establishment of CAFE standards requires estimates of economic conditions, product mix, the benefit/cost of technology, and the impact of external factors. As demonstrated by our testimony, there are dramatic differences between Ford's estimates of the benefit of technology compared to those made by OTA and DOE. Should standards be established with such assumptions, overestimates of small car/engine mix or failure to recognize effects of various federal standards, it will impose an unrealistic burden on manufacturers.

Senator **Bryan**. Thank you very much, Ms. Petrauskas.

Ms. Harrington.

STATEMENT OF TONI HARRINGTON, MANAGER, GOVERNMENT AND INDUSTRY RELATIONS, HONDA NORTH AMERICA, INC.

Ms. **Harrington**. Good afternoon, Senator Bryan.

Honda appreciates the opportunity to appear before this Subcommittee. We will summarize our statement and put the full text into the record.

Senator **Bryan**. Your full statement will be included.

Ms. **Harrington**. Honda is the fourth largest automobile producer in the United States. Our model mix has grown over the past 20 years in response to consumer demand to include sporty, luxury, and family cars.

During this time, fuel efficiency has always been one of our very important considerations, and fuel economy improvements have taken place despite changes in emission and safety standards and changes in consumer demand for more powerful engines, air conditioning, and power accessories.

The 1989 Department of Energy Report on Automobile Fuel Efficiency listed three Honda vehicles among the 20 most efficient, and that included the four door Civic made in Ohio.

Our CAFE reflects the change in our model mix as well as our technological advances to improve fuel economy.

We do strongly oppose the percentage increase approach taken in S. 1224. The percentage increase approach is a dramatic departure from the current practice which requires all manufacturers of motor vehicles to meet the same standards with regard to safety, emissions, and fuel economy.

The new approach punishes those companies who have already made commitments to improving fuel economy through the use of advanced technology and tends to treat more favorably those manufacturers who have not done so.

Further, the proposal severely limits competition by freezing the current product mix and could conceivably eliminate certain models from our product line.

The percentage increase approach creates a wide disparity of fuel economy levels. Beginning in 1995, the difference between the lowest and highest standards is 12.5 miles per gallon, and by the year 2001, the difference is as high as 15.2 miles per gallon.

Using the percentage increase approach would also mean that the bulk of the U.S. fleet would meet much lower standards, thus conserving less fuel.

The recent OTA report, which has been cited many times this morning, indicated that a fuel economy level of 33 miles per gallon by 1995 could be reached by intensifying the use of existing technology.

Honda vehicles currently use all of the significant technologies, so the opportunity for improvement is limited.

For example, to improve its aerodynamics, Honda's average coefficient of drag is 0.33, which is below the OTA estimate maximum value of 0.34. Much has been said of four valve engines and for the

1990 model year, all but two of our models will have a four valve engine.

The average improvement from Honda from the use of existing technologies is between 4 percent and 5 percent. This is far, far from the 20 and 40 percent increases called for in S. 1224.

Further, the 20 and 40 percent increases in S. 1224 lack a sound technological basis. OTA has reservations about the percentage increase approach, and their data does not support such a high CAFE number as the bill requires.

Honda is continuing to improve the fuel efficiency of our vehicles. We are continuing research in reducing rolling resistance, improving aerodynamics, reducing weight through new and better structures and materials, and the improvement of the engine and power train. Much of this requires basic research and will not be ready for vehicles in 1995. Yet, this is what is needed in order to meet the standards set forth in S. 1224.

As you know, over 50 percent of all Honda automobiles sold in the United States are made in Ohio by American workers. The cost of meeting this high level of corporate fuel efficiency will place our vehicles at a competitive disadvantage, and this could negatively impact our U.S. manufacturing operations.

In conclusion, Honda strongly opposes the percentage based CAFE standards in S. 1224. The approach is discriminatory, restrictive, and sets unrealistically high standards. It will be destructive to the auto industry since no technology exists to support such high numbers, while satisfying other vehicle attributes required by U.S. consumers.

We do support a strategy to combat global warming. But it should be done in a cross-disciplinary and globally coordinated fashion. Pursuing only automotive fuel efficiently at this time is premature and will not result in any appreciable benefit.

If the existing CAFE system needs to be changed, we believe the establishment of different size, weight, or interior volume classes, as proposed by OTA, is a more equitable approach than the percentage increase approach in S. 1224. We also believe that some kind of market incentive is necessary to encourage the general public to buy fuel efficient automobiles.

We thank you for your time and we welcome the opportunity to work with you and your staff.

[The statement and questions and answers follow:]

STATEMENT OF HONDA NORTH AMERICA, INC.
ON
S. 1224, MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989
BEFORE THE CONSUMER SUBCOMMITTEE
SENATE COMMERCE, SCIENCE AND TRANSPORTATION COMMITTEE

September 7, 1989

Good morning. I am Toni Harrington, Manager, Government and Industry Relations, Honda North America. Honda appreciates the opportunity to present its views on S. 1224, Motor Vehicle Fuel Efficiency Act of 1989. Before going into the discussion of the content of the proposed legislation, we would like to point out that, if the goal is to formulate a strategy to combat global warming, it should be done in a cross disciplinary and globally coordinated fashion. Pursuing only automotive fuel efficiency without achieving international coordination and before a comprehensive national energy and resources management strategy is established is simply premature and will not result in any appreciable benefit.

Honda has grown from an importer of small cars and motorcycles in the 1970s to become the fourth largest automobile producer in the U.S. Our model mix has broadened over the past twenty years in response to consumer demand to include sporty, luxury and family cars. During this period, fuel efficiency has always been one of our important considerations and automobile fuel economy improvements have taken place despite changes in emissions and safety standards and consumer preferences for air conditioning, power accessories and more powerful engines. Our CAFE reflects the change in our model mix as well as our technological advances to improve fuel economy.

We strongly oppose the percentage increase approach taken in S. 1224. The percentage increase approach is a dramatic departure from the current practice which requires all manufacturers of motor vehicles to meet the same standards with regard to safety, emissions and fuel economy. This new approach punishes those companies which have already made commitments to improving fuel economy through the use of advanced technologies and tends to treat more favorably the majority of manufacturers who have not done so. Further, the proposal severely limits competition by freezing the current product mix and could conceivably eliminate certain models from our product line.

The percentage increase approach creates a wide disparity of fuel economy levels. Beginning in 1995, the difference between the lowest and highest standards is 12.5 mpg and by

2001 the difference is as high as 15.2 mpg. This is shown in Attachment 1. Using the percentage increase approach would also mean that the bulk of the U.S. fleet would meet much lower standards, conserving less fuel.

The recent Office of Technology Assessment (OTA) report indicated that a fuel economy level of 33 mpg by 1995 could be reached by intensifying the use of existing technologies. The OTA level of 33 mpg in 1995 assumes the application of existing technologies. Honda vehicles currently use many of these technologies so the opportunity for improvement is limited, as shown in Attachment 2. The average improvement for Honda from the use of existing technologies is between 4-5%. This is far from the 20% and 40% increases called for in S. 1224. It is generally more difficult to improve fuel economy as the base fuel economy becomes higher. Further, the 20% and 40% increases called for in S. 1224 lack a sound technological basis. OTA has reservations about a percentage increase approach and their data does not support such a high CAFE standard as the bill requires.

Honda continues to improve the fuel efficiency of our vehicles. We are continuing research on reducing rolling resistance, improving aerodynamics, reducing weight through better structural design and new materials, and improvement of the engine and powertrain. Much of this requires basic research and will not be available for vehicles in 1995; yet this is what is needed to meet the standards required under S. 1224.

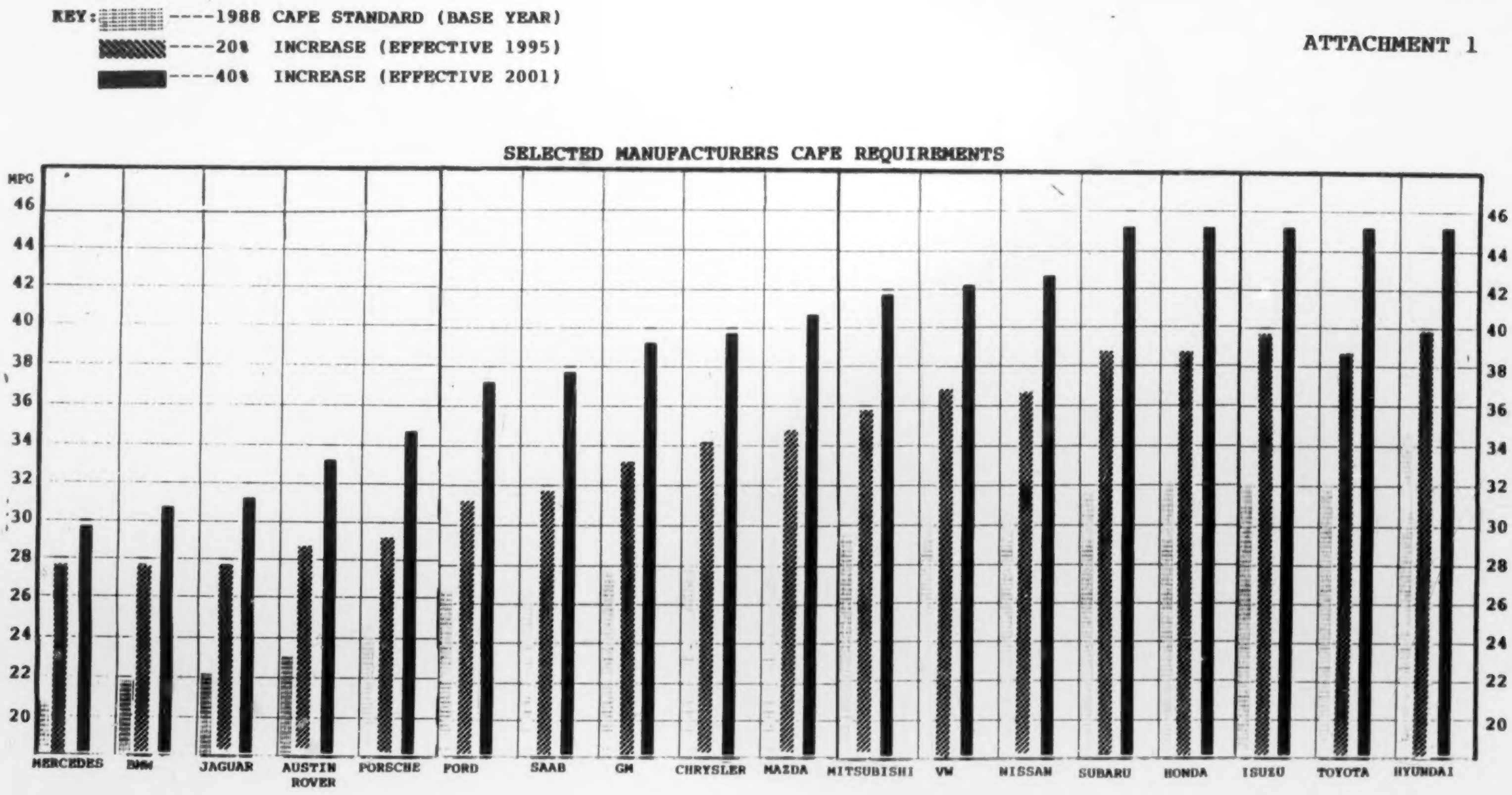
The cost of meeting this high level of corporate fleet fuel efficiency will place our vehicles at a competitive disadvantage vis-a-vis our competitors. This could negatively affect our U.S. automobile manufacturing operations. Over half of all the Honda automobiles sold in the United States are made in Ohio by American workers.

In conclusion, Honda strongly opposes the percentage based CAFE standards proposed in S. 1224. This approach is discriminatory, restrictive, and sets unrealistically high standards. It will be destructive to the auto industry since no technology exists to support such high numbers while satisfying other vehicle attributes required by U.S. consumers.

If the existing CAFE system needs to be changed, we believe the establishment of targets for different size/weight classes or interior volume, as suggested by OTA, is much more equitable than the percentage increase approach advocated by this bill. We also believe that some kind of market incentive is necessary to encourage the general public to buy fuel-efficient automobiles.

We thank the Subcommittee for allowing us to testify on this important issue. We welcome the opportunity to work with you and your staff on this legislation.

ATTACHMENT 1


SELECTED MANUFACTURERS CAFE REQUIREMENTS

ATTACHMENT 2

	EEA Est.[1]	Industry[2]	Honda[3]
Front Wheel Drive	12.0%	-	Using
Engine Improvements			
4-cylinder/4-valve	10.0/5.0%	4.5% or less	Using
Overhead Camshaft	6.0%	Low	Using
Roller Cam Followers	1.5%	0.5 - 4.0%	1 - 1.5%
Low Friction Rings/Pistons	1.5%	-	Using
Throttle Body Fuel Injection	3.0%	0 - 3.0%	1 - 2.0%
Multipoint Fuel Injection	7.0%	4.0%	1 - 2.0%
Intake Valve Control	4.0%	1 - 2.0%	Using
4-Speed Automatic Transmission	7.5%	5 - 6.0%	Using
Electronic Transmission Control	1.5%	Low	1.5%
Aerodynamics, CD 0.37 to 0.34	3.4%	3.0%	1 - 2.0%
Tire Improvements	0.5%	-	0.5%
Lubricants (5w-30)	0.5%	-	Using
High Efficiency Accessories	1.0%	-	No plan

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[1] Based on OTA Analysis.

[2] Based on OTA Analysis.

[3] Based on Honda Analysis.

HONDA
HONDA NORTH AMERICA, INC.
955 L'ENFANT PLAZA, S.W., SUITE 5300
WASHINGTON, D.C. 20024 (202) 554-1650

October 5, 1989

The Honorable Richard Bryan
Consumer Subcommittee
Committee on Commerce, Science
and Transportation
U.S. Senate
SH227 Hart Senate Office Building
Washington D.C. 20510

Dear Senator Bryan:

Enclosed are the responses requested to the additional questions posed by the Subcommittee. We are concerned, however, that there are a number of competing demands on the industry. The goals of increasing fuel economy, improving air quality, and improving vehicle safety are all laudable. However, Congress must decide which goals are the priority as there are trade-offs and conflicts between the technology and the resources to accomplish each goal. CO2 reduction to reduce global warming cannot be done done in isolation.

Given this as a premise, all our answers to your questions assume no change in the current safety and emissions standards. More stringent emissions standards coupled with increased vehicle weight for safety purposes will make the task of improving fuel economy much more formidable.

We do appreciate the opportunity to be an active participant in this important public policy decision.

Sincerely,

Toni Harrington

Toni Harrington
Manager
Government and
Industry Relations

TH/kf

Please wear your seat belt and drive safely

October 5, 1989

RESPONSES TO POST-HEARING QUESTIONS OF SENATOR BRYAN

1. Please state your view as to the likely trend in vehicle miles traveled in the United States. If you would project a change in vehicle miles traveled, please state the percentage by which you estimate vehicle miles traveled will change per year between the present and 2005.

A. The U.S. Federal Highway Administration estimates a 2% annual increase in vehicle miles traveled (VMT) over the next five to ten years. The rate of increase is projected to decline, in part, due to a decrease in the number of newly licensed drivers. VMT is affected by such other factors as fuel availability and price, the state of the economy, population growth, commuting distance, availability of mass transit, transportation control plans, as well as government policies affecting these factors. We believe government can and should influence future VMT growth by various means if it wishes to mitigate the CO2 problem.

* * *

2. If you project that vehicle miles traveled will increase, please state how you would propose maintaining the current status quo with respect to carbon dioxide emissions and energy consumption from the passenger vehicle sector in light of those increases.

A. Minimizing CO2 increases due to an increase in VMT could be accomplished through a combination of measures such as:

1) Government efforts to minimize the growth of vehicle travel by planned urban/suburban development coupled with effective mass transit systems;

2) Government decisions to provide incentives for fuel efficient vehicles;

3) Accelerated vehicle turnover by increasing the registration fee on older vehicles; and

4) Introduction of non-carbon fuels.

Because CO2 emissions can occur from sources other than automobiles, such efforts should be accompanied by similar measures in all other sectors of the economy.

* * *

3. As you may know, the 1988 international conference in Toronto, "The Changing Atmosphere: Implications for Global Security," adopted a goal of a 20% reduction in 1986 levels of carbon dioxide emissions by 2005. Please provide any plans you would recommend to achieve that goal for passenger vehicle carbon dioxide emissions. Include in your plan any increases you would project in vehicle miles traveled, and state what level of fuel economy you believe would be necessary to achieve that goal.

A. We believe that it is premature to establish specific reduction goals or plans to achieve such goals. The U.S. must continue its study on the basic need for controls. We support the principles set forth in the recent FY 90 research report of the Committee on Earth Sciences, which was released by the White House. The report covers many interdisciplinary areas. It notes that many changes to the earth's atmosphere have occurred for centuries and are not just the result of human actions. Any study must go far beyond the automotive sector.

When the proper scientific basis permits establishing a target reduction of CO2 for automobiles, as part of any overall reduction effort, the following factors must be considered:

1) Current state of each manufacturer's technology;

2) Mechanisms to introduce fair competition for future technology development; and

3) Marketplace incentives for the purchase of fuel efficient vehicles.

* * *

4. There was a discussion at the Subcommittee hearing of a carbon fee or carbon tax, and such a measure was recommended by some aspects of the auto industry as a means of dealing with carbon dioxide emissions. Please provide a detailed discussion of the type of carbon fee or tax you would recommend. Include in your answer your opinion on whether the monies collected from such a fee should be earmarked for

any particular purpose, such as a rebate to encourage the purchase of fuel efficient vehicles.

A. We believe the concept of a carbon fee has merit. Revenue raised by such a fee should be available for a tax credit for the purchasers of fuel efficient vehicles. The program should be revenue neutral.

* * *

5. Please provide your views on the effectiveness of a fee/rebate scheme that would collect fees for the purchase of vehicles with low fuel efficiency and use those fees to provide rebates as incentives for the purchase of highly fuel efficient vehicles.

A. Direct government intervention in the pricing of vehicles is sensitive at best and must be studied carefully to address the following concerns:

1) Too high a fee on fuel inefficient vehicles may be self defeating since the resulting poor sales of these vehicles may undercut the revenue source. Further, the elimination of large cars for family use may force some families into two cars, thus doubling VMT for that trip.

2) Too high a rebate for fuel efficient vehicles may encourage VMT growth by increasing the absolute number of small vehicles.

A fee/rebate scheme would be more complex to institute and administer than is an increase in the gasoline tax, a more appropriate form of government intervention in the marketplace. A higher gasoline tax may better achieve the objective of a reduction in fuel consumption than would a fee/rebate program.

* * *

6. Please state what average levels of fuel economy, for both cars and light trucks, you believe your fleets will attain in 1995 and 2001.

A. We estimate that Honda's average fuel economy for passenger vehicles, assuming no change in our model mix, will be 33-34 mpg in 1995. Our ability to further improve fuel economy in the near term is limited since our products already use the existing advanced technologies identified by

OTA to increase fuel economy. We cannot estimate a value for the year 2001 because no new technologies have been identified to further improve fuel economy. Honda does not produce trucks.

* * *

7. You testified at the recent hearing of the Consumer Subcommittee in opposition to S. 1224. Assuming for the purpose of this question that fuel efficiency must be improved over the next decade to the levels set by the legislation for 2001, please provide alternatives to S. 1224 that you would recommend to achieve improved fuel economy at the levels established by the legislation. If you do not believe such levels are possible, please provide alternative forms of regulation or alternative levels of fuel economy that you believe are feasible and would achieve the maximum possible improvement in the fuel economy of the passenger vehicle fleet.

A. We oppose the percentage based standard because it is unfair and anticompetitive. It penalizes those manufacturers such as Honda, who have already made the commitment to achieve high levels of fuel economy; it fixes the current model mix; and is a radical departure from current practice which requires all manufacturers to meet the same standards with regard to safety, emissions and fuel economy. The target number for Honda is not supported by available technology.

Any future requirement for higher fuel efficiency must meet the following conditions:

1) Each manufacturer's use of technology should be evaluated;

2) The best available technology should be applied to all models;

3) Innovation should be encouraged through competition;

4) The standard must be technologically feasible; and

5) It must assure overall CO2 reduction.

We propose a vehicle class based target similar to the one proposed by OTA. We think some form of market incentive for fuel efficient vehicles is also necessary. The individual class targets should be established by evaluation of existing technology as well as future innovation projections.

Senator **Bryan**. Thank you very much for your testimony, Ms. Harrington.

Mr. Benefield.

STATEMENT OF JERRY L. BENEFIELD, PRESIDENT AND CHIEF EXECUTIVE OFFICER, NISSAN MOTOR MANUFACTURING CORP.

Mr. **Benefield**. Thank you very much, Mr. Chairman. We have presented our full testimony in writing.

Senator **Bryan**. That will be made a part of the record, Mr. Benefield.

Mr. **Benefield**. Thank you.

Today, I am not only representing my own company as President of Nissan Motor Manufacturing Corporation U.S.A., but I am also representing Nissan Motor Corporation in U.S.A., which is our sales and distribution company in the United States, and Nissan Research and Development, Incorporated, the design arm of Nissan's U.S. operations.

We appreciate this opportunity to present our views on S. 1224.

Nissan is committed to offering vehicles which incorporate the best combination of fuel efficiency, performance and quality. We believe that the offering of these vehicles has been the key to our success in the U.S. market, and we will continue to make these attributes central to our vehicle design philosophy.

There is a common misconception that Nissan's achievement of high levels of vehicle fuel economy have been effortless and that we have had a free ride under the CAFE standards since 1978. In fact, Nissan's CAFE in 1988 was higher than its 1978 CAFE, and we have always been above the required standard.

Nissan's high average fuel economy has resulted from the implementation of advanced technology, not just from the sale of smaller vehicles. In fact, many of our current vehicles are larger than the vehicles in our 1978 fleet.

We have acted responsibly in the past by designing vehicles that reflect energy conservation concerns, and we will continue to do our share to help meet energy use and global warming concerns.

In spite of Nissan's leadership in fuel economy and environmental matters, we have serious concerns about S. 1224. The bill represents a significant departure from current policy on automotive fuel efficiencies. Under current law, all manufacturers must meet the same standards.

S. 1224 would establish manufacturer-specific standards based on a uniform percent increase over a base-year fuel economy level. We do not believe that S. 1224 is based on a manufacturer-specific analysis that supports the feasibility of each manufacturer's standards or compares the competitive impact of these differential standards.

Such an analysis would account for differences among manufacturers in current technology use rates, permitting appropriate projections of future capabilities to be made.

This point is important with respect to Nissan's fuel economy improvement capability, since we have implemented available advanced technology to a greater than average extent. Nissan has already implemented higher than average rates of front wheel drive, power trains, multivalve overhead cam engines, four speed automotive transmissions, aerodynamic improvements, and multipoint fuel injection.

Having already implemented this technology to a greater than average extent, less of the available proven technology remains for us to implement in the future.

A manufacturer specific percentage improvement requirement would be unfair to high mileage manufacturers, such as Nissan, because such an approach would require those companies to achieve a greater absolute improvement in fuel economy and a higher CAFE than low mileage manufacturers.

Also, fewer options are available to high mileage manufacturers to achieve improved fuel economy than are available to low mileage manufacturers.

While Nissan offers a full line of vehicles, Nissan's fleet is mostly small sized cars. Further significant downsizing as fuel economy strategy would likely result in vehicles that would fall short of the space and comfort needs of U.S. car buyers.

Some further improvement of fuel economy can be obtained by limited downsizing and reducing weight and performance. However, these measures alone will not be sufficient to meet the new standards.

Thus, with most of the available technology and downsizing options already incorporated, Nissan's primary option for substantial fuel economy improvement would be unproven and/or very costly new technology.

In contrast, the low mileage manufacturers would have the following options: incorporating all of the technology already in use in high mileage manufacturers, downsizing, weight reduction and reduced performance, and, if necessary, incorporating unproven and/or costly technologies.

If CAFE standards were to result in requiring high mileage manufacturers to offer very expensive or unacceptably small cars relative to other competitors, this would have the effect of freezing out high mileage manufacturers from effective competition in the U.S. marketplace.

If this were to occur and low mileage manufacturers were to gain market share at the expense of high mileage manufacturers, the percent improvement approach would not realize the fleet fuel economy improvement intended.

Thus, the goal of improving average fuel economy and reducing energy consumption would not be achieved.

It appears to us that the policy embodied in S. 1224 in and of itself could cause the adverse market shift.

If Congress determines that it is necessary to establish more stringent fuel economy standards, then it should consider alternatives that do not have the discriminatory and potentially self-defeating impacts associated with the percentage improvement concept. The approach should require an even application of technology among manufacturers and maintain a competitive market environment.

We believe there are better alternatives to accomplish this objective.

Nissan believes that the most important consideration in energy conservation and CO_2 reduction by the U.S. transportation sector is the perceived value of fuel efficient vehicles by the consumer. The Congress should consider ways to encourage the purchase of fuel efficient vehicles as an alternative to a regulatory program which would establish fuel economy standards, and which may discriminate against some manufacturers.

Nissan opposes the percent improvement concept in S. 1224. This approach is unfair because it discriminates against high mileage manufacturers, such as Nissan. Any market share shift, for whatever reason, to low mileage manufacturers would cause the percent improvement policy to fail.

Alternative approaches should be considered. We have a tendency to support the class size based concept that Senator Gore talked about this morning.

Mr. Chairman, let me thank you for the opportunity to present our thoughts to you on this matter.

[The statement and questions and answers follow:]

STATEMENT OF
NISSAN MOTOR MANUFACTURING CORPORATION U.S.A.
NISSAN RESEARCH & DEVELOPMENT, INC.
NISSAN MOTOR CORPORATION IN U.S.A.

BEFORE THE U.S. SENATE
COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION
CONSUMER SUBCOMMITTEE

ON S. 1224,
"THE MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989"

I. INTRODUCTION

Good morning. I am Jerry Benefield, President and Chief Executive Officer of Nissan Motor Manufacturing Corporation U.S.A. My company is a subsidiary of Nissan Motor Co., Ltd. of Japan, and constitutes Nissan's entry into the automotive manufacturing business in the United States. We began manufacturing vehicles in 1983. I am here today to represent not only my own company, but also Nissan Motor Corporation in U.S.A., the distributor of vehicles in the United States, and Nissan Research & Development, Inc., the design arm of Nissan's United States operations. Together, we are living proof of Nissan's major commitment to the U.S. market. We appreciate this opportunity to present our views on S. 1224, the Motor Vehicle Fuel Efficiency Act of 1989.*

Nissan is the sixth largest producer of passenger cars and light trucks for the United States. Nissan Motor Manufacturing Corporation U.S.A. in Smyrna, Tennessee, employs almost 3,300 workers, and has the capacity to produce 240,000 vehicles annually. We expect to expand production capacity to 440,000 vehicles by 1992, adding 2,000 new jobs. Nissan Motor Corporation in U.S.A. in Carson, California, employs 2,140 employees in 13 facilities across the United

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*: All three Nissan companies are independent, wholly-owned subsidiaries of Nissan Motor Co., Ltd. of Tokyo, Japan.

States. Nissan Research & Development, Inc., which is establishing permanent headquarters in Farmington Hills, Michigan, employs 260 people involved in the design and development of vehicles for the U.S. market. Other Nissan-owned operations in the United States employ 1,200 people in 12 United States facilities. Nissan has over 1,000 dealerships throughout the country, employing over 47,000 people.

Nissan offers a full line of high quality, fuel efficient vehicles in the U.S. market, ranging from small economy cars such as the Sentra to larger family cars like the Maxima, and now including the Axxess passenger van, which can accommodate seven passengers and their luggage. This fall, we will introduce the first models in our mid-size luxury car line called the Infiniti, which will broaden our ability to meet the automotive needs of the American public.

Nissan is committed to offering the best combination of fuel efficiency, performance and quality. We believe that the offering of these vehicles has been the key to our success in the U.S. market, and we will continue to make these attributes central to our vehicle design philosophy.

There is a common misconception that Nissan's achievement of high levels of vehicle fuel economy has been effortless, and that we have had a "free ride" under the CAFE standards since 1978. In fact, Nissan's CAFE in 1988 was higher than its 1978 CAFE and we have always been above the required standard. Nissan's high average fuel economy has resulted from the implementation of advanced technology, not just from the sale of smaller vehicles. In fact, many of our current vehicles are larger than the vehicles in our 1978 fleet. We have acted responsibly in the past by designing vehicles that reflect energy conservation concerns, and we will continue to do our share to help meet energy use and global warming concerns.

In addition, we have made significant contributions to the environmental goals of the United States. For example:

- Nissan plans to introduce certain models in 1993 that will not use CFC-12 as the mobile air conditioning refrigerant. Our plans for 1993 are contingent on the successful toxicity testing of the most promising substitute, HFC-134a. Nissan's goal is to eliminate CFC's in vehicle air conditioners and in other manufacturing applications by the mid-1990's. Nissan is also planning to discontinue the sale of 14-oz. cans of CFC-12 for "do-it-yourself" aftermarket use. We are no longer purchasing cans of CFC-12 and expect that our current inventory will be depleted within the next 12 months. In addition, we plan to make recycling equipment available to Nissan dealers and to require its use for warranty repairs of mobile air conditioners, at a cost competitive with industry costs for such equipment.

- Nissan has been active in the development of methanol-fueled vehicles. We are currently participating in a methanol technology demonstration program with EPA, and we are currently negotiating an agreement with the California Energy Commission (CEC) to provide a prototype, flexible-fuel 1989 Nissan Stanza.

- EPA's newly published regulation to phase out the use of asbestos requires that all brakes be asbestos-free by the 1994 model year. However, currently, all Nissan models are equipped with front disc brakes that are asbestos-free. Nissan is now working to make all its models completely asbestos-free by some time in 1992, in advance of the EPA requirement.

II. CONCERNS REGARDING S. 1224

In spite of Nissan's leadership in fuel economy and environmental matters, we have serious concerns about S. 1224. S. 1224 represents a significant departure from current U.S. policy on automotive fuel efficiency. Under current law, all manufacturers (except very small companies) must meet the same standard. S. 1224 would establish manufacturer-specific standards based on a uniform percent increase over a base year fuel economy level.

Under S. 1224, Nissan would be required to raise its passenger automobile fuel economy standards for model years 1995-2000 from 30.8 mpg (miles per gallon) to approximately 37 mpg; the standard for the year 2001 and thereafter would be approximately 43 mpg. By contrast, a manufacturer with a 1988 CAFE equal to the 1988 standard of 26.0 mpg would have to meet standards of 31.2 mpg in 1995 and 36.4 mpg in 2001. This means that Nissan would have to meet a 6 mpg higher absolute standard and make an improvement of about 2 mpg more than the low mileage competitor. This point is illustrated by the attached chart (Attachment I) which shows several manufacturers' 1988 CAFEs, and the standards that would apply for 1995 and 2001.

Nissan Already Employs Many Advanced Technologies

We do not believe that S. 1224 is based on a manufacturer-specific analysis that supports the feasibility of each manufacturer's standard, or compares the competitive impacts of these differential standards. Such an analysis would account for differences among manufacturers in current technology use rates, permitting appropriate projections of future capabilities to be made. This point is important with respect to Nissan's fuel economy improvement capability, since we have implemented available, advanced technology to a greater-than-average extent. Attachment II to our statement compares Nissan's use of fuel economy-improving technology to the industry average, as computed by the Office of Technology Assessment. In particular, Nissan has already implemented higher than average rates of front-wheel drive power trains, multi-valve, overhead cam engines, four-speed automatic transmissions, aerodynamic improvements, and multipoint fuel injection. Having already implemented this technology to a greater-than-average extent, less of the available, proven technology remains for us to implement in the future.

Low Mileage Manufacturers Have More Options to Improve Fuel Economy

A manufacturer-specific percentage improvement requirement would be unfair to high-mileage manufacturers such as Nissan, because such an approach requires those companies to achieve a greater absolute improvement in fuel economy and a higher CAFE than low mileage manufacturers. Also, fewer options are available to high mileage manufacturers to achieve improved fuel economy than are available to low mileage manufacturers. While Nissan offers a full line of vehicles, Nissan's fleet is mostly small size cars. Further significant downsizing as a fuel economy strategy would likely result in vehicles that would fall short of the space and comfort needs of U.S. car buyers. Some further improvement of fuel economy can be obtained by limited downsizing, and reducing weight and performance. However, these measures alone will not be sufficient to meet the new standards. Thus, with most of the available technology and downsizing options already incorporated, Nissan's primary option for substantial fuel economy improvement would be unproven and/or very costly new technology.

In contrast, the low mileage manufacturers would have the following options:

1) incorporating the technology already in use in high mileage manufacturers' vehicles;

2) downsizing, weight reduction and reduced performance; and

3) if necessary, incorporating unproven and/or costly technology.

The Market May Shift to Low Mileage Manufacturers

Under the manufacturer-specific percentage improvement CAFE, Nissan and other high-mileage manufacturers would have to produce vehicles that would be very expensive or unacceptably small because of fuel economy requirements. Consumers would not want to buy these cars because they would have the option of buying larger, less expensive models offered by the current low-mileage manufacturers. This point is made in a June 6, 1989 letter from Samuel K. Skinner, Secretary of the Department of Transportation, to Chairman Dingell of the House Energy and Commerce Committee. On Page 11 of that letter, the Secretary, in commenting on advanced unproven fuel economy technology used in several prototype vehicles, states:

> The sale of such high fuel economy vehicles would be constrained by consumer attitudes toward the cost of the features (fuel economy technology) relative to the cost of the fuel saved and the inconvenience of the features. For example, the material substitution in the

Volvo vehicle using a high content of aluminum, magnesium and carbon fiber would result in a vehicle that would be exorbitantly expensive for the fuel saved at today's prices. Consumers may object to the low performance of some highly efficient drive-train designs, such as the small, direct injected diesel engines used in both prototypes. Additionally, these prototype vehicles often do not meet all current U.S. safety and emission standards. These prototypes were built to demonstrate the capability for high fuel economy, but in some cases, adequate provisions for crash worthiness and occupant protection either were not incorporated or were not thoroughly tested. The direct injected diesel engine used in some of these vehicles may not meet passenger car emission standards, because of the high level of particulates which are emitted. Full development of these prototypes may result in compromises to comply with other Federal standards that will reduce fuel economy.

Fuel Economy Savings Anticipated Under S. 1224 May Not Occur

If CAFE standards result in requiring high-mileage manufacturers to offer very expensive or unacceptably small cars relative to other competitors, this would have the effect of "freezing out" high mileage manufacturers from effective competition in the U.S. market. If this occurs and low mileage manufacturers gain market share at the expense of high mileage manufacturers, the percent improvement approach would not realize the fleet fuel economy improvement intended. Thus, the goal of improving average fuel economy and reducing energy consumption would not be achieved. It appears to us that the policy embodied in S. 1224, in and of itself, could cause the adverse market share shift.

We believe that the same problems described above apply to the light truck standards established under the bill.

III. ALTERNATIVE FORMS OF STANDARDS

If Congress determines that it is necessary to establish more stringent fuel economy standards, then it should consider alternatives that do not have the discriminatory and potentially self-defeating impacts associated with the percentage improvement concept. The approach should require an even application of technology among manufacturers and maintain a competitive market environment.

As an alternative to standards based on manufacturer-specific percentage improvements, the Office of Technology Assessment (OTA) recommended a vehicle size class-based standard. The size-class standards would be based on a uniform percent increase in the base year average fuel economy for all vehicles in each class. OTA concludes that its approach results in the application of technology rather than significant downsizing that could change the size class mix.

The major criticism of the OTA approach is that it would not guarantee fuel economy improvements if consumer demand caused a shift in the sales mix to larger vehicles. However, OTA assumes that a model mix shift does not occur. As we have pointed out, we believe the percent improvement approach would likely cause a market share shift to low-mileage manufacturers which would adversely affect the potential for fuel economy improvements. A market share shift would reduce competition, making fewer choices available to consumers. The premise of the OTA approach is that there would be an even application of the requirements and thus competition and consumer choice will be preserved.

Given that both manufacturer-specific percentage improvement standards and class-based standards have the potential for not achieving the goal of fuel savings, we believe the better choice is the class-based standard. If model mix shifts were to occur under the class standard due to a shift in consumer preference for larger vehicles, then the Congress should consider combining the size class standard with incentives for consumers to purchase fuel efficient vehicles.

Another version of size-class standards would be to base a standard on the EPA's interior volume index multiplied by fuel economy. This surrogate standard could be established on a uniform percent improvement over a similar surrogate calculated for the industry in a base year. The interior volume based standard would be continuous and would eliminate the concern expressed by some that discrete standards would permit manufacturers to bunch their vehicles at the edge of the class, and thus diminish the effect of more stringent standards in the adjacent class.

Also, a simple increase in the current CAFE would not be subject to the potential for failure associated with percent improvement in the event of market share shifts.

We have included a study by Energy and Environmental Analysis, Inc., on alternative approaches to fuel economy improvement. This study concludes that the percent increase standard clearly has the most anti-competitive effects, while the size-class-specific standard has the least.

V. CONCLUSION

Nissan has been a leader in the implementation of advanced automotive technology to improve fuel efficiency. We plan to continue to aggressively pursue such efficiency improvements in the future, regardless of any action taken by Congress with regard to future standards.

Nissan believes the most important consideration in energy conservation and CO_2 reduction by the U.S. transportation sector is the perceived value of fuel-efficient vehicles by the consumer. The Congress should consider ways to encourage the purchase of fuel-efficient vehicles as an alternative to a regulatory program which would establish fuel economy standards which may discriminate against some manufacturers.

Nissan opposes the percent improvement concept in S. 1224. This approach discriminates against high-mileage manufacturers such as Nissan, and will be counterproductive in terms of fuel economy improvement. Alternative approaches should be considered which require an even application of technology and maintain competition in the auto industry.

Again, let me thank you, Mr.Chairman, for the opportunity to present our thoughts on this matter, and I would be happy to answer any questions you may have.

Attachment I

COMPARISON OF DIFFERENT CAFE STANDARDS REQUIRED UNDER S. 1224

MANUFACTURER	'88 Model Year CAFE* (St'd = 26.0 mpg)	CAFE Standard under S.1224	
		1995 -2000 MY	2001 MY -
NISSAN	**30.8****	**37.0**	**43.1**
MERCEDES	21.3	27.5	29.8
BMW	21.6	27.5	30.2
JAGUAR	22.0	27.5	30.8
PEUGEOT	23.4	28.1	32.8
PORSCHE	24.7	29.6	34.6
VOLVO	26.0	31.2	36.4
FORD (Domestic)	26.4	31.7	37.0
SAAB	26.5	31.8	37.1
GM (Domestic)	27.6	33.1	38.6
CHRYSLER (Domestic)	28.4	34.1	39.8
MAZDA	28.7	34.4	40.2
MITSUBISHI	29.8	35.8	41.7
VW	30.3	36.4	42.4
SUBARU	31.8	38.2	44.5
HONDA	32.0	38.4	44.8
ISUZU	32.6	39.1	45.0
TOYOTA	32.6	39.1	45.0
HYUNDAI	35.0	40.0	45.0

*Source: NHTSA Automotive Fuel Economy Program 13th Annual Report to Congress (Federal Register, July 19, 1989, pp. 30310-20)

**Source: NISSAN (1988 Final CAFE)

Attachment II: FUEL ECONOMY IMPROVEMENT TECHNOLOGIES BY NISSAN

TECHNOLOGY TO IMPROVE FUEL ECONOMY	% PENETRATION			
	'87MY MARKET (OTA)	'87MY NISSAN	'88MY NISSAN	'89 MY NISSAN
Front-wheel Drive	78.0	91.1	91.3	81.0
4-cylinder/4-valve	5.0	2.2	3.7	72.0[*1]
Four-speed Automatic[*2] [Automatic Transmission market share]	35.0 (40.1) [87.3[*3]]	32.2 (59.1) [54.5]	23.6 (46.3) [50.9]	30 (57.3) [52.4]
Electronic Transmission Control	2.0	3.8	4.4	25.0
Aerodynamics (Cd from 0.37 to 0.32) --(Average Cd)	N/A	N/A (0.36)	N/A (0.36)	N/A (0.35)
Tires	N/A	N/A	N/A	N/A
Accessories	N/A	N/A	N/A	N/A
Engine Improvements:				
-Overhead Cam Engines	40.0	100.0	100.0	100.0
-Roller Cams	40.0	0.0	0.0	0.0
-Low Friction Rings/Pistons	N/A	N/A	N/A	N/A
Non-carbureted:	76.0	59.7	99.4	100
-Throttle Body Fuel Injection (TBI)	31.0	12.3	63.9	54.0
-Multipoint Fuel Injection (MPI)	45.0	45.0	35.5	46.0[*4]

NOTES:
[*1] Includes 3-valve engines
[2] Figures in parentheses shows 4-speed penetration within A/T class
[3] This figure is MVMA, not OTA, data
[4] In '91MY, Multipoint Fuel Injection will reach 100% penetration

NISSAN **Nissan Motor Manufacturing Corporation U.S.A.**

Jerry L. Benefield
President and
Chief Executive Officer

September 27, 1989

The Honorable Richard H. Bryan
Chairman, Consumer Subcommittee
Committee on Commerce Science
and Transportation
The United States Senate
Washington, D. C. 20510-6125

Dear Senator Bryan:

In response to your letter of September 18th, I am submitting for the record of the subcommittee's September 7th hearing on S. 1224, the Motor Vehicle Fuel Efficiency Act of 1989, Nissan's responses to the written questions you posed subsequent to my testimony before the subcommittee.

Several of your questions take as a point of departure a request that we project to the year 2005 the growth in vehicle miles traveled in the United States. Unfortunately, Nissan is simply not knowledgeable enough about the variables involved to make an independent projection with any degree of confidence. To the extent that this reduces the utility of our responses to the subcommittee's questions, I can only convey my regret.

While we continue to have grave concerns about the impact of S. 1224 upon Nissan's ability to compete effectively, we nevertheless appreciate the opportunity you have provided us to convey our views to the subcommittee, both directly at the hearing and through the enclosed responses to the subcommittee's questions.

Sincerely,

Jerry L. Benefield

JLB:jd

Nissan Drive Smyrna, Tennessee 37167 (615) 459-1433

NISSAN RESPONSES TO THE SENATE CONSUMER SUBCOMMITTEE POST-HEARING QUESTIONS ON FUEL ECONOMY ISSUES

1. **Please state your view as to the likely trend in vehicle miles traveled in the United States. If you would project a change in vehicle miles traveled, please state the percentage by which you estimate vehicle miles traveled will change per year between the present and 2005.**

   Some available analyses suggest that vehicle miles traveled (VMT) in the United States will increase over time. However, Nissan is not in a position to project the rate of growth at which VMT will increase in the United States.

   It is extremely difficult to project future changes in vehicle miles traveled without reliable, comprehensive data on the trend in future vehicle registrations, driver licensing, highway construction and congestion, fuel prices, fuel type, alternative available transportation modes, expected lifestyle changes, and overall economic health. Lacking this data, Nissan does not have its own projection on the likely trend in VMT in the United States.

2. **If you project that vehicle miles traveled will increase, please state how you would propose maintaining the current status quo with respect to carbon dioxide emissions and energy consumption from the passenger vehicle sector in light of those increases.**

   There are other strategies which may be more effective than would new motor vehicle fuel efficency standards, since it will take more than a decade to replace the existing vehicle fleet once new standards are imposed. In the U.S., approximately 7% of the existing light vehicle fleet is replaced annually by new vehicles. We believe measures to address the energy consumption of older vehicles will be effective, especially in the case of vehicles which are 10 years old or older. Since those vehicles have outdated fuel efficient technologies employed, encouraging their replacement with vehicles employing newer, more fuel-efficient technologies would tend to have a positive effect on overall fleet fuel consumption. The U.S. government should therefore consider ways to encourage the fleet turnover (for reasons of both fuel economy improvements and emissions reductions). Likewise, proper maintenance and strong inspection/maintenance programs tend to ensure against increases in the fuel consumption of older vehicles due to malmaintenance or malfunctioning equipment.

Reduction of chlorofluorocarbons (CFC's) by the automotive sector will also have far more significant impact on global warming than would unilateral efforts to reduce carbon dioxide by one sector. To this end, Nissan has initiated aggressive plans to phase out the use of CFC's in manufacturing, mobile air conditioning and aftermarket (14-ounce can) applications, and to require recycling for warranty repairs of mobile air conditioners.

3. **As you may know, the 1988 international conference in Toronto, "The Changing Atmosphere: Implications for Global Security," adopted a goal of a 20% reduction in 1986 levels of carbon dioxide emisisons by 2005. Please provide any plans you would recommend to achieve that goal for passenger vehicle carbon dioxide emisisons. Include in your plan any increases you would project in vehicle miles traveled, and state what level of fuel economy you believe would be necessary to achieve that goal.**

Goals set for reducing passenger vehicle carbon dioxide emissions should be set in consideration of the effect of consumer behavior on the goals. For example, if the goals require technology and associated cost for which the consumer perceives no benefit, and if gasoline prices remain relatively stable and low, then consumers may retain their older vehicles and lack motivation to purchase more fuel efficient vehicles.

In the case of manufacturer-specific percentage improvement standards as required by S. 1224, we believe that consumer behavior will likely cause the goal of fleet-wide fuel economy improvement to fail. If Nissan and other high mileage manufacturers must meet more stringent standards than low mileage competitiors by using expensive new technology at the same time that low mileage manufacturers can make greater use of existing technology and downsizing, consumers will purchase the less expensive vehicles offered by the low mileage manufacturers. If the low mileage manufacturers gain market share at the expense of high mileage manufacturers, this could defeat the implied goal of S. 1224.

While manufacturers could be required to introduce practicable fuel-efficient technologies into the market and could develop vehicles using alternative energy sources, advanced powertrains and advanced fuel-efficient technologies overall, Nissan believes it is the appropriate role of the government to encourage consumer demand for these items, and to encourage vehicle turnover and good maintenance of existing vehicles.

Goals for carbon dioxide reductions in the motor vehicle fleet should also be implemented in such a way that the burden is shared equally among all manufacturers, and so that manufacturers who have been above the standard in past years are not penalized for their efforts by relatively more stringent requirements. A policy based on manufacturer-specific percent improvement is inherently flawed in that the implementation technique itself could cause the policy to fail: a market share shift from high-mileage to low mileage manufacturers which we foresee occurring under S. 1224 could result in a failure to realize the fleet fuel economy improvement intended.

Greater gains are more likely to be achieved by shifting consumer demand toward more fuel-efficient vehicles than by corporate average fuel economy standards applied in a discriminatory fashion.

4. **There was discussion at the subcommittee hearing of a carbon fee or carbon tax, and such a measure was recommended by some aspects of the auto industry as a means of dealing with carbon dioxide emissions. Please provide a detailed discussion of the type of carbon fee or tax you would recommend. Include in your answer your opinion on whether the monies collected from such a fee should be earmarked for any particular purpose, such as a rebate to encourage the purchase of fuel efficient vehicles.**

   Nissan does believe that in principle, a direct carbon fee has the potential to spur greater consumer consciousness of the need to conserve energy more effectively than a "command and control", product-based regulation. A carbon fee is fair in that it recognizes carbon dioxide contributions from all sources, rather than just those attributable to the transportation sector. However, Nissan has no analysis in support of a specific recommended structure or level for a carbon fee. Nevertheless, we suggest that the U.S. government should consider such an analysis, since a carbon fee may be more effective in reducing carbon dioxide than more stringent CAFE requirements.

   Nissan does not have a specific recommendation on earmarking of the monies collected, except to say that a revenue-neutral fee/rebate to encourage the purchase of fuel-efficient vehicles does recognize the need to involve the consumer in government energy conservation initiatives.

5. **Please provide your views on the effectiveness of a fee/rebate scheme that would collect fees for the purchase of vehicles with low fuel efficency and use those fees to provide rebates as incentives for the purchase of highly fuel efficient vehicles.**

Market-driven incentives will tend to enhance the value of fuel-efficient vehicles in the eyes of the U.S. consumer, particularly in the absence of rising energy prices or perceived energy availability concerns. This would also provide motivation to manufacturers to develop and offer new fuel-efficient technologies. Thus, consumer incentives (such as a rebate) for the purchase of high-mileage vehicles, as well as disincentives (such as surcharges or increased registration fees) for purchasing or retaining low-mileage vehicles, have merit and deserve further consideration by the Congress.

6. **Please state what average levels of fuel economy, for both cars and light trucks, you believe your fleets will attain in 1995 and in 2001.**

   Although Nissan intends to aggressively pursue fuel-efficient technology in the future, the major breakthrough technologies have already been adopted for the most part in our vehicles. Only minor gains in fuel economy can be expected in the near future. Our fuel economy potential in this time frame will also be influenced by the effect of other motor vehicle regulations (safety, emission controls, CFC restrictions) on vehicle weight and technology, some of which involve fuel economy tradeoffs. The combined effect of side impact and passive restraint occupant protection standards, a 0.4 gpm NOx standard, and onboard vapor refueling technology, if required in new vehicles, would cause a reduction in fuel economy in Nissan vehicles, for example. DOT by law is required to consider the effect of other motor vehicle regulations on fuel economy when setting CAFE standards for this reason.

   Fuel economy improvement for future years is also highly dependent on the assumptions that are made on competitive factors (for example, the consumer demand for power and luxury equipment, for fuel-efficient technologies, and so on). We have not therefore been able to project a specific level of future fuel economy improvement with any degree of certainty.

7. **You testified at the recent hearing of the Consumer Subcommittee in opposition to S. 1224. Assuming for the purpose of this question that fuel efficiency must be improved over the next decade to the levels set by the legislation for 2001, please provide alternatives to S. 1224 that you would recommend to achieve improved fuel economy at the levels established by the**

legislation. If you do not believe such levels are possible, please provide alternative forms of regulation or alternative levels of fuel economy that you believe are feasible and would achieve the maximum possible improvement in the fuel economy of the passenger vehicle fleet.

We believe that if Congress deems it necessary to revise the current CAFE program, customer behavior must be considered. Exclusive focus on the product side of the equation will make real carbon dioxide reductions an elusive goal. An alternative which can motivate consumers to be interested in fuel economy coupled with cost-effective technology improvements may be a more effective approach.

As indicated in Nissan's written statement, S. 1224 is not a fair approach because it would establish separate goals for individual manufacturers for the first time in the history of automotive regulation. We believe there are several options that should be considered which maintain competition. A class-based standard is one possibility; it requires an even application of technology among manufacturers and could be combined with consumer incentives to ensure that the anticipated fuel savings is accomplished. We tend to agree with Senator Gore's remarks at the hearing that the Congress should consider ways to encourage the purchase of fuel-efficient vehicles, such as through a revenue-neutral fee/rebate scheme to which he alluded. Any approach taken to improve fuel economy should be fair and not discriminate among manufacturers, and should attempt to influence consumers to buy fuel efficient vehicles.

Senator BRYAN. Mr. Benefield, thank you very much.

Mr. Landesman.

STATEMENT OF EARL LANDESMAN, PRINCIPAL, A.T. KEARNEY, INC., CLEVELAND, OH

Mr. LANDESMAN. Mr. Chairman, today I would like to highlight the findings of the automotive suppliers' survey on fuel economy and emission controls conducted this spring by A.T. Kearney, Incorporated. Excuse me for my cold.

This was a Kearney-sponsored survey, and was not done for a client. The 95 survey participants included some of the largest automotive suppliers serving the industry and covering the major material and vehicle component areas.

The following are the opinions of the survey participants. The average supplier recommendations for passenger care CAFE for 1995 and 2000 were 33.1 miles per gallon and 40.7 miles per gallon, respectively.

This represents a 16 percent increase and a 42 percent increase over 1988 model year average fuel economy as reported by the EPA.

The suppliers generally felt optimistic about their ability to assess car manufacturers to improve fuel economy. Indeed, the two primary reasons cited for their optimism were, one, their previous efforts in the early eighties to reduce rates through use of advanced materials and, two, the conviction that if given a clear goal, they could focus their internal efforts and resources to get the job done.

The suppliers also believed a comprehensive and integrated approach by the car manufacturers will be required to significantly increase fuel economy.

In our report, the suppliers believe the following areas represent the greatest opportunity for improving fuel economy in order of impact: weight reduction, power train and drive line improvements, and greater use of aerodynamics.

I am going to continue to refer to the report during my discussions.

The suppliers believe that there will be clear winners and losers among the industry participants as the car manufacturers are required to improve fuel economy averages to identify these players, we asked who would be the winners and losers if passenger car CAFE was moved to 50 miles per gallon to the late 1990s or 2000.

Referring to our report, the clear winners among the car manufacturers are the Japanese. The clear losers are the Big Three. The winners in the supplier industry are the suppliers of plastics and composites, electronics, aluminum, metal alloys, fuel injection systems as well as the Japanese supply industry.

The losers are the suppliers of steel, large metal parts, the oil industry, engine parts manufacturers, transmission parts, and the U.S. supply industry.

Finally, the suppliers were generally optimistic about the impact of increased fuel economy and emissions controls on their companies.

Seventy-one percent of the suppliers anticipated revenues either increasing or staying the same, and 66 percent anticipated their profits either staying the same or increasing.

Also, 71 percent of the suppliers indicated that their companies are preparing themselves for the eventual increase in fuel economy and emission controls as noted on page 46.

On the other hand, the suppliers are not optimistic about the impact of increased fuel economy and emission controls on the domestic car manufacturers.

Sixty percent of the suppliers anticipate a Big Three revenues increasing to compensate for higher vehicle cost reflecting the anticipated higher vehicle cost. 54 percent of the suppliers predict Big Three earnings will decline while 83 percent of the suppliers anticipate increased capital investment by the Big Three will be required.

Our conclusions from the study are the following: Automotive suppliers are generally optimistic about their ability to respond. The key is setting targets and putting into action government policies that are coordinated and are not at odds with industry efforts.

The financial impact of addressing CAFE and stricter emissions by the Big Three is considered a very real issue by the suppliers combined with increasing global competition and three million units of Japanese capacity planned for North America in the 1990s.

Government policy formations must consider the impact on the competitive position of the domestic industry which you obviously are.

Suppliers believe government CAFE targets must be reflected in the comprehensive energy policy. Equally suppliers believe automotive, environmental and energy issues are interlinked.

The automotive industry needs a single comprehensive energy and environmental policy.

I want to thank the Chairman for the opportunity to share with you our views and findings.

[The statement follows:]

STATEMENT OF EARL LANDESMAN, PRINCIPAL, A.T. KEARNEY, INC., CLEVELAND

Mr. CHAIRMAN. Today I would like to highlight the findings of the "Automotive Supplier Survey on Fuel Economy and Emission Controls," conducted this spring by A.T. Kearney, Inc., an international management consulting firm.

This was a Kearney-sponsored survey and was not done for a client. We wanted to understand from the suppliers' point of view what would be required to respond to increased CAFE standards and what would be the potential impact on the automotive industry. Secondly, we wanted to better understand these issues in order to help our clients make better informed decisions on product and technology needs for the 1990s.

The 95 survey participants included some of the largest automotive suppliers serving the industry and covering the major materials and vehicle component areas. The individuals interviewed were identified by their companies as being among the most familiar with fuel economy and emissions issues. The responses were given based on the understanding that the company's name would not be disclosed.

The following are the opinions of the survey participants.

The average supplier recommendation for passenger car CAFE for 1995 and 2000 were 33.1 miles per gallon and 40.7 miles per gallon, respectively. This represents a 16 percent and 42 percent increase over the 1988 model year average passenger car fuel economy as reported by the EPA.

The suppliers generally felt optimistic about their ablility to assist the car manufacturers to improve fuel economy. The two primary reasons cited for their optimism were (1) their previous efforts in the early 1980s to reduce weight through use of advanced materials, such as lighter metal alloys and greater use of plastics, and (2) the conviction that, if given a clear goal, they could focus their internal resources to get the job done.

The suppliers also believe a comprehensive and integrated approach by the car manufacturers will be required to significantly increase vehicle fuel economy. On page 28 of our report, the suppliers believe the following areas represent the greatest opportunity for improving fuel economy in order of impact: (1) Weight reduction cited by 61 percent of the respondents; (2) Powertrain and driveline improvements cited by 57 percent of the respondents; and (3) Greater use of aerodynamics cited by 51 percent of the respondents.

Further, suppliers believe a variety of material and component developments are necessary to improve fuel economy. On page 30 of our report, the categories cited include: (1) Engine components and material developments cited by 46 percent of the respondents; (2) Alternative materials for weight reduction and high-temperature applications cited by 35 percent of the respondents; and (3) A final point, many development areas cited were wide ranging, suggesting that every area of vehicle design and componentry must be considered.

The suppliers believe that there will be clear winners and losers among the industry participants as the car manufacturers are required to improve fuel economy averages. To identify these players, we asked who would be the winners and losers if passenger car CAFE was moved to 50 miles per gallon by the late 1990s or 2000.

1. On page 36, the clear winners among the car manufacturers are the Japanese.
2. On page 37, the clear losers are the Big 3.
3. On page 38, the winners in the supplier industry are the suppliers of: plastics and composites, electronics, aluminum, metal alloys, fuel injection systems and Japanese suppliers.
4. On page 38, the losers are the suppliers of: steel, large metal parts, the oil industry, engine parts, transmission parts and U.S. suppliers. (Engine and transmission parts suppliers were cited because the participants felt that many of these suppliers were tied to old component and materials technology. Thus, they felt there would be a net reduction in the number of suppliers as the car manufacturers move

to new engine designs requiring advancements in component designs and greater usage of advanced materials.

Finally, the suppliers were generally optimistic about the impact of increased fuel economy and emission controls on their companies. On page 45, 71 percent of the suppliers anticipated revenues either staying the same or increasing and 66 percent anticipated their profits either staying the same or increaseing. Also, 71 percent of the suppliers indicated that their companies are preparing themselves for the eventual increase in fuel economy and emissions standards, as noted on page 46.

On the other hand, the suppliers are not optimistic about the impact of increased fuel economy and emission controls on the domestic car manufacturers. On page 45, 60 percent of the suppliers anticipated Big 3 revenues increasing to compensate for higher vehicle cost. Reflecting the anticipated higher vehicle cost, 54 percent of the suppliers predict Big 3 earnings will decline while 83 percent of the suppliers anticipate increased capital investment by the Big 3 will be required.

Our conclusions from this study are the following:

Automotive suppliers are generally optimistic about their capabilities to respond. The key is setting targets and putting into action government policies that are coordinated and not at odds with industry efforts

The financial impact of addressing CAFE and stricter emissions by the Big 3 is considered very real by the suppliers

Combined with increasing global competition and 3 million units of Japanese capacity in North America in the 1990s, government policy formulations must consider the impact on the competitive position of the domestic industry

Suppliers believe government CAFE targets must be reflected in a comprehensive energy policy

Equally, suppliers believe automotive environmental and energy issues are interlinked

The automotive industry needs a single comprehensive energy and evironmental policy.

Our recommendations are the following:

A joint industry task force of OEM's suppliers and academicians should be formed. The primary tasks are to present a comprehensive set of industry and government actions necessary to achieve improved fuel economy and emission standards, and to identify the associated impact on the industry and economy.

Government must encourage basic research and development to facilitate technological breakthroughs. Federal funding would provide a catalyst to tap creativity and capability of the industry, providing direct grants for research and development proposals by OEMs, automotive suppliers, and consortiums resulting from the joint industry task force.

CAFE laws must consider the impact on the competitive position of the domestic industry. Options that might be considered include setting targets by passenger car and light truck segments that recognized industry segment mix to achieve overall fuel economy improvements, and establishing percentage improvement targets for 1995 and 2000, using a company's 1988 or 1989 average fuel economy as the base.

I want to thank the Chairman and the Committee for the opportunity to share with you our findings and views.

Senator BRYAN. Thank you very much, Mr. Landesman. Let me begin with you, if I may.

The survey that you have shared with us indicates a much more optimistic scenario than the auto industry has portrayed.

Would it be your view that this sample that you have taken is representative of the suppliers in this country?

Mr. LANDESMAN. I would say that it is representative. Specifically, we talked to some of the largest suppliers in the industry. Their optimism was primarily reflected on the work that they did in the 1980s. The twist is that they see there are potential technologies they can apply to the cars, especially in the use of advanced materials. But the question is the cost penalty of using those materials. And that is why we see the situation where they are anticipating their earnings increasing while they conversely see a big three earnings declining as a result of using advanced materials and technologies.

Senator **Bryan**. Mr. Landesman, as you have heard, the thrust, at least, and part of the automotive testimony is that much of the technology that has been projected as helping attain the 40- 45-mile-per-gallon standard is already in place and, therefore, you cannot calculate that twice to get to the higher standard, whether it be a 40-mile-per-gallon standard or the 45-mile-per-gallon standard that we have heard.

I gather from the standpoint of the suppliers that you surveyed—you believe that there is much technology out there that can be added to the automotive product that will help us get to those higher standards, whether it is 40 or 45.

Mr. **Landesman**. The answer is yes.

The issue is that the suppliers are aware of technology. The question is investing in the technology as Senator Kerry was raising with the R&D issue. There is technology that is identified. The question is applying that technology. And so the question is, How we get that technology to the marketplace?

And, as we recommend, there should be R&D funding, and it should target the supply industry and not just the big three.

Senator **Bryan**. Thank you very much.

Ms. Petrauskas, I do not want to neglect you. I asked the other two members of the big three some questions about the 1974 testimony and the testimony on behalf of Ford was, as you heard, pretty much everybody was going to be driving a Pinto or a combination of a Maverick and a "sub, sub compact."

I think all of us would recognize that that did not occur, and my question to, you, first, is a philosophical one. Do you believe that CAFE standards play a role in achieving greater fuel efficiency?

Ms. **Petrauskas**. If I may just say, Mr. Chairman, before I answer your question, my own personal track record in this regard is even worse than what you read, and I do not even have the luxury of saying it was somebody else that said it on behalf of Ford. I said it on behalf of Ford. Back in 1979 or 1980 when we were in the depths of the depression in our industry and when fuel prices were thought to be heading for $2 and $2.25 a gallon I sat before this committee and said and believed every word I said that in 1985 our CAFE would exceed 30 miles per gallon. I believed it, and I had a basis for believing it.

As I look back on that, which was my own testimony and then the testimony of some of my predecessors, I am struck by our inability not just in our industry, but among those of our colleagues in government to predict what will happen to energy prices, what will happen to customers' perceptions about fuel ability and how will customers react.

For that same reason, Mr. Chairman, I have always been reluctant to try to apportion the fuel economy gains that have been made—so much to the thrust of CAFE alone and some other part to consumer demand for fuel economy.

My judgment and the data we have seems to indicate it was probably a mix of both.

Senator **Bryan**. Sure, and I am not trying to put words in your mouth, but you are saying, if I understand correctly, and please correct me if I misstate your position, that CAFE played a part.

Ms. **Petrauskas**. I believe it played a part, Mr. Chairman. Now, how great a part is another question. When I look at the domestic industry—Ford, GM and Chrysler which basically for the last 14 years have been the only manufacturers that have been directly affected by the CAFE law, I think it had a different effect on us than it might have had on our foreign competitors who made undisputed progress in fuel economy, but were free to do so in response to their perceptions as to what their customers wanted. We had a double job to do.

Senator **Bryan**. I think, Ms. Petrauskas, to be fair, all of us who lived through that time, or at least many of us thought fuel prices would be much higher today than they are, and there are factors that have created that that are beyond your control and beyond the power of the Congress to directly control.

My concern in terms of the credibility issue is the dire prophesy that this is an un-American approach. The automobile is going to have to be radically reconfigured. Nobody is going to be able to tow a trailer or a boat or a camper. Those kinds of things clearly did not happen, and clearly the industry underestimated its own resourcefulness. That is the point that I am trying to make.

If you believe that CAFE plays a part—and I think that is your testimony, to be fair to you—what part, if any, should it play in terms of encouraging the industry to improve its fuel efficiency standards beyond what they are today?

Ms. **Petrauskas**. I guess a couple of observations, Mr. Chairman. One that we made earlier, if we are to have a law that is directly related to product requirements as opposed to a greenhouse fee or some approach of that sort, we need find a fairer approach than the one we have today.

Senator **Bryan**. Are we talking about the percentage increases versus the flat increase or are you talking about different numbers in terms of levels of attainment?

Ms. **Petrauskas**. I think it is both. I believe one has to look at the concept and the methodology that is used to define the requirement on the one hand and then having satisfied one's self that that is the right concept, you then have to ask the question, given that concept, where do we want to set the benchmark. Both of those have to be considered.

Senator **Bryan**. I am not sure that I heard an answer to my question and that is whether or not you think CAFE plays a role in encouraging higher fuel efficiency standards from the industry, whatever reconfiguration the calculations may take or the form of the CAFE standard.

Ms. **Petrauskas**. I would certainly—looking back, I will not dispute the notion that setting a goal or setting a fuel improvement goal was something that was helpful in the sense that some improvement can be attributed to it.

When I look at the question of what ought that goal look like for the next 15 years as opposed to the last 15 years, I would urge that several things be calculated into that goal.

One is to take a serious look as we are increasingly beginning to do as to what the role of fuels other than petroleum fuels is in the context of this goal.

And then similarly, the notion of looking at a broad-based greenhouse fee. I do not mean to evade your question. My point is that for the future I think we need a more comprehensive energy policy than we have had in the past because basically in the past we have had only one energy policy in this country, and that was CAFE.

Senator **Bryan**. I think I would agree with you that we need a broader policy review and an approach, but do you think that setting a goal beyond where we are today, whatever that goal is—and let me not marry you to a number at this point—is that helpful prospectively?

You have indicated you think that it was helpful, at least, in 1975.

Ms. **Petrauskas**. I think it would be helpful if we answered to our satisfaction some pretty important questions and factored those answers into our articulation of that goal.

Senator **Bryan**. And I am not suggesting this is mutually exclusive of the carbon fee that you and others have talked about.

If one were to set a goal in terms of miles per gallon for 1995 and 2001, to at least track the time bracketing in the legislation, do you have a number that you think is attainable?

Ms. **Petrauskas**. We have indicated in both our testimony and our prior responses to the committee that in terms of 1995 we estimate we could improve our average fuel economy anywhere from 4 to 7½ perhaps.

Senator **Bryan**. Could you translate for those of us who went to school when the old math was in vogue? What would that mean in rough numbers in terms of miles per gallon?

Ms. **Petrauskas**. That would be somewhere from 28½ to 29½ miles per gallon.

Now, why do I give you a range? I give you a range because in some respects our confidence is not high with regard to the uppermost limit of that range. It represents what we hope to achieve if we hit all home runs.

History tells us sometimes you do not hit all home runs.

Senator **Bryan**. So, you are talking roughly a mile or two beyond the present mandate of 27½?

Ms. **Petrauskas**. That is correct, Mr. Chairman.

Senator **Bryan**. If I could carry you to the year 2001 and ask you to translate that into miles per gallon, what number would you come up with there?

Ms. **Petrauskas**. There, Mr. Chairman, I would be reluctant to try to identify a number because our confidence level, our certainty, with regard to that number is just not high enough.

If we look in a narrow sense, for example, look simply at the OTA analysis and ask ourselves if we were to use such data as we have and compare it to the OTA analysis, where would we be, our guess is about half of what OTA has projected.

One important caveat, if I may, Mr. Chairman, we have not rolled into those estimates the potential effect of tougher emissions standards and perhaps even more importantly, the potential effect of the weight that we expect to add to our vehicles in order to make some of the safety improvements that both the regulations demand, and I think our customers want.

Senator **Bryan**. Would you visualize the carbon tax as revenue-neutral with the revenues generated to be used for a customer rebate mechanism to encourage the purchase of more fuel-efficient automobiles? Would you share your thinking in terms of its design and implementation?

Ms. **Petrauskas**. Well, let me say at the outset that when we have talked about a carbon fee, it was in a more traditional sense one that would apply a fee related to global warming potential on all fuels. We have not considered the question as to what then is done with that revenue. And we continue to look at that idea and we continue to believe it has merit in terms of the alternative that Senator Gore articulated.

I hope we would have the opportunity to provide more comprehensive comments for the record of the hearing.

Let me make two observations. One, I believe it would be very important to structure the approach in such a way that the customer whose transportation needs require a large station wagon or whose transportation needs require a pickup truck, and who buys a very fuel-efficient vehicle for the function it serves is not discriminated against relative to that consumer whose transportation needs are satisfied with a subcompact.

Senator **Bryan**. You might do it, then, by class of vehicle based upon the efficiency within the class.

Ms. **Petrauskas**. Certainly that is something that we would need to think about because fuel efficiency in major part has to be also a measure of the function that is provided.

I guess the second observation whether we are talking about fuel efficiency or safety or reduction of pollution, there is no question that today's vehicles represent a major improvement over prior generations.

And while it sounds terribly self-serving for us to say that, one of the best things we could do for clean air—you know, 50 percent of the vehicles put out 80 percent of the pollutants—one of the best things we could do for clean air is accelerate the turnover of vehicles.

And the same could be said for safety and the same could be said for improving our efficient use of energy.

Senator **Bryan**. One last question. Philosophically, are you troubled with the notion that that fee or tax be set aside or earmarked for a rebate mechanism? Does that give you any problem philosophically?

Ms. **Petrauskas**. I am not an economist, Mr. Chairman, but having listened to a lot of economists in my life, they always caution that one needs to do the analysis to determine the consequences to the economy.

Senator **Bryan**. Ford has not taken a position at least with respect to that aspect?

Ms. **Petrauskas**. We have taken no position with respect to how the revenues from a carbon fee might be used.

Senator **Bryan**. Thank you very much.

Ms. Harrington, you expressed your opposition both orally and in your written testimony to the percentage increase. I would like to get your suggestion as to how we deal with the problem that, frankly, with respect to your company there has been a backsliding in terms of fuel efficiency standards over the last three years.

You have surpassed what is required by law. All of us would recognize we ought to be moving in the direction of more fuel efficiency. You ought to be commended for exceeding the standard. On the other hand, it is hard to give you accolades for having achieved that standard and then over the past three years seeing that fuel efficiency deteriorate.

What do you suggest that we do to address that issue, if not a percentage increase?

Ms. HARRINGTON. I think you are referring to backsliding. We do not feel that our company or other companies should be penalized for introducing new models into their fleet when they are satisfying the demands of their customers and it is what the market wants, particularly when those models are fuel efficient within the class and still keep the manufacturers' CAFE standard way above the average.

Furthermore, we think that the anti-backsliding provisions could be harmful when a company's CAFE declines due to social and economic change over which they have no control.

I understand your concern from an energy policy standpoint, but over all we still continue to be very fuel efficient class for class. An example I use is that the four-door Civic made in Ohio which is a subcompact vehicle gets a fuel economy of 35 miles per gallon. That car weighs the same and is about the same size of a 1979 Accord model which got a fuel economy of 28 miles per gallon.

So we are increasing our fuel economy by vehicle class size, but what you have seen happening in our case is the introduction of a new class of vehicle, a new size of vehicle.

Senator BRYAN. I think you would have to concede that if our goal is to be less energy dependent upon foreign sources of oil, and if our goal is the reduction of greenhouse gasses, carbon dioxide contributing more than half of all of the primary greenhouse gasses, we do have a bit of an inconsistency there. We allow an auto maker, not just singling out your company but anyone, to make some major breakthroughs and then allow that to, in effect, deteriorate, and exacerbate rather than improve the situation.

Ms. HARRINGTON. I do not think we view it the same way. I understand what you are saying. What we feel is that even with the decline in our average over the past several years we are still about 4 to 5 miles per gallon above the standard. So we would be penalized, but according to the rules we are way above the standard.

That is one of the reasons that we are looking at something like an interior volume or size or weight class which enables you the flexibility to shift your product but still be efficient within your class. I think that might address your concern.

Senator BRYAN. Thank you very much.

Mr. Benefield, let me ask you a little bit about the carbon fee proposal. You have heard the colloquy from several of the members of the subcommittee suggesting the imposition of a fee on those that are more polluting, and use of that money for some kind of a rebate or an incentive mechanism to purchasers who buy more fuel efficient automobiles.

How does that concept strike you?

Mr. **Benefield**. We would like to study it a little more. We have only briefly looked at it in the past, but I think it has some potential and we ought to look at it.

Senator **Bryan**. Do you agree that market incentives ought to be at least part of the strategy that we utilize in terms of greater fuel efficiency?

Mr. **Benefield**. I think that we have to do something, Mr. Chairman. Regarding the discussion you were just having with Ms. Harrington, the most fuel efficient vehicle in our fleet is our Sentra passenger car. From 1988 to 1989 our actual mileage is going to go down just a little bit, but the major reason for that is that fewer people are buying our Sentras and more people are buying the upscale vehicles. We have done nothing differently. So we have to convince the consumers in the marketplace that they need to buy fuel efficient automobiles, or it does not matter what we do here or what kind of law you write.

Senator **Bryan**. I guess, Mr. Benefield, one could argue that there may be corporate responsibility involved. I think there is general agreement that we need to be less energy dependent. Certainly we do not need to be more so. We certainly need to be conscious of the emission of the primary greenhouse gasses in terms of potential environmental problems.

Mr. **Benefield**. We do not disagree with that. But we spoke earlier about what was said in 1978 and 1979 about what was going to happen as a result of CAFE standards. In some of the testimony today we said we either had to downsize or things were going to cost a lot more.

One thing that did not come out is that even though we have doubled fuel economy in that time period, we have also doubled the price of the vehicles, and it is probably going to happen again in the next 10 years if we have to continue with technology improvements.

So it is all market driven, but I do agree that we ought to be responsible, and we do not want the environment to suffer. We all have to breathe the air. So we want to cooperate in every way that we can under reasonable and fair circumstances.

Senator **Bryan**. Mr. Benefield, we appreciate your testimony and the testimony of each of you on this panel. There will be some additional questions from other members of the subcommittee who are not here. We would appreciate your response to those.

I thank all the members who participated today.

This subcommittee stands in recess.

[Whereupon, at 1:50 p.m. the hearing was adjourned.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

AUTOMOBILE IMPORTERS OF AMERICA, INC.
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COMMENTS OF THE AUTOMOBILE IMPORTERS OF AMERICA, INC.
ON S. 1224 TO THE
CONSUMER SUBCOMMITTEE OF THE
SENATE COMMERCE, SCIENCE AND TRANSPORTATION COMMITTEE

AIA is a non-profit trade association that represents U.S. importers of passenger cars and light trucks.[1] We welcome the opportunity to comment on behalf of our members on S. 1224 and more generally on the issues of fuel economy and global warming.

As we stated in our written comments to the Consumer Subcommittee in May of this year, there are several important points that must be considered in addressing global warming. First, global warming is just that, global, and solutions must address not only activity in the U.S., but in all countries of the world. Second, it is imperative that we set realistic objectives and assure ourselves that any proposed action will help reach those objectives. Third, these actions must be part of a comprehensive, long-term plan that provides adequate leadtime to allow the affected industries to achieve objectives without severely disrupting their operations. Finally, any requirements that are imposed on our society must be fair, rational, and effective.

Let me address S. 1224 in the context of these points. Its approach is far from global, or even national, since it focuses on only the automobile industry. Second, we believe the objectives are not realistic. They would require major vehicle design changes that may not be acceptable to the public and result in poor sales of the more fuel efficient vehicles. Third, this bill does not represent a long-term comprehensive view, but rather a crisis management approach that does not account for the feasibility of these new standards. Finally, these requirements are not fair and logical, nor are they likely to be effective in changing the motor vehicle purchasing habits of the public.

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[1] AIA's members include: BMW of North America, Inc.; American Honda Motor Company, Inc.; Hyundai Motor America, Inc.; Isuzu Motors of America, Inc.; Jaguar Cars, Inc.; Maserati Automobiles, Inc.; Mazda Motors of America, Inc.; Mitsubishi Motor America, Inc.; Nissan Motor Corporation U.S.A; Peugeot Motors of America, Inc.; Porsche Cars North America, Inc.; Rolls-Royce Motor Cars, Inc.; Rover Group USA, Inc.; Saab-Scania of America, Inc.; Subaru of America, Inc.; American Suzuki Motor Corporation; Toyota Motor Sales U.S.A., Inc.; Volkswagen of America, Inc.; and Volvo North America Corporation.

Changes to the CAFE standard should not be considered in a vacuum. As noted in the preamble to the bill, one of the issues prompting this legislation is concern over global warming. This is an issue that deserves to be addressed. However, it is unreasonable that this subcommittee should take unilateral action to alter CAFE standards apart from consideration of all the causative factors responsible for global warming. Such a major international issue deserves broader consideration. At a minimum, there should be coordinated action on this issue between committees of the U.S. Congress with different jurisdictions. A better step would be a global conference, as was held on the reduction of CFC use, to address this issue. This is an action we strongly support and one that has been called for by both the President and the United Nations.

EPA has estimated that the contribution of the existing fleet of cars and light trucks to total U.S. anthropogenic carbon dioxide emissions is about 16 percent and about four percent on a worldwide basis.[2] Controls on the new vehicle fleet would, then, have very little effect. The Congressional Office of Technology Assessment (OTA) has estimated that with an increase in the new car fleet average to 32.5 miles per gallon (mpg) in 1995 and 33.3 mpg in 2000, the savings would be only 0.5 percent of the fossil fuel carbon dioxide emissions in the year 2010 in the U.S., and about

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[2] Statement of Richard Wilson, EPA before the Subcommittee on Energy and Power of the House Energy and Commerce Committee, July 13, 1989

0.1 percent worldwide.[3] On the other hand, a National Aeronautics and Space Administration (NASA) atmospheric scientist was quoted in the Wall Street Journal saying "that fires account for as much as 45 percent of the carbon dioxide released into the atmosphere."[4] While autos are a contributor to the global carbon dioxide emissions inventory, they are clearly not the sole, nor even the primary concern. This underscores the need for a more comprehensive approach to global warming and the necessary actions to solve the problem.

The bill calls for increases of 20 and 40 percent in 1995 and the year 2001, respectively, from individual manufacturer fleet averages achieved in the 1988 model year. These increases far exceed the achievable fuel economy in that timeframe as predicted by those with expertise in fuel economy. At hearings before the Subcommittee on Energy and Power of the House Energy and Commerce Committee on July 13, 1989, OTA testified that a new car fleet average of perhaps 31 mpg could be achieved in 1995, up from the current level of 28.2 mpg (achieved in 1989), without market distortions.

The National Highway Traffic Safety Administration (NHTSA) said, at this same hearing:

> It makes little sense to require manufacturers to make changes which would theoretically improve fuel economy if consumers refuse to purchase those vehicles... the mere existence of a particular fuel economy enhancing technology, in and of itself, should not imply that actual fleet fuel economy can be improved. We believe technology cannot, and should not, be evaluated in the absence of other factors, particularly that of consumer acceptance.

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[3] Statement of Steven Plotkin, OTA before the Subcommittee on Energy and Power of the House Energy and Commerce Committee, July 13, 1989.

[4] Wall Street Journal, March 15, 1989.

NHTSA points out the critical failing of this bill and others that seek to increase CAFE standards. An increase in CAFE will not necessarily have an impact on consumer demand, particularly if gas prices remain at their current level. Absent changes in the marketplace that lead consumers to perceive the need for improved fuel economy, more efficient vehicles will not sell if compromises in vehicle attributes important to the consumer are made in an attempt to achieve these higher standards. If, as a result, older cars are kept longer, fuel economy will not improve. NHTSA concurs in this view:

> ...customers might react adversely to cars with higher fuel economy if these vehicles are perceived as lacking in size, performance, or other desired attributes. Consumers could react to these new cars by keeping their older, less efficient cars longer...which would lead to the unintended effect of _increased_ fuel consumption.[5]

This bill causes us concern in another respect. It represents a radical departure from previous legislative and regulatory actions to control the automobile industry. It has always been the practice of the government to set uniform performance standards for all automakers to meet. This bill would alter this even-handed approach by varying the difficulty of requirements by manufacturer. The Federal regulatory approach -- whether toward food and drugs, aircraft, or even motor vehicles -- has been to set a standard that all companies must meet; thus affording the equality of treatment that the Constitution demands.

Under this concept, a manufacturer with a high CAFE would be penalized for its past efforts and would not only have to increase the fuel economy of its fleet more than one whose CAFE level was lower (i.e., 10% of 20 versus 10% of 30), but these gains would be more difficult to achieve. Improving mileage from 35 to 40 mpg is much more difficult than improving from 28 to 33 mpg.

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[5] Statement of Barry Felrice, NHTSA before the Subcommittee on Energy and Power of the House Energy and Commerce Committee, July 13, 1989.

Limited-line manufacturers would also be penalized by dramatic increases in fleet fuel economy requirements. The make-up of the new motor vehicle fleet would be radically altered and limited-line manufacturers would be further unfairly penalized, facing a total disruption in their market niche.

We are also concerned that there is insufficient recognition in the bill of the multitude of regulatory changes being faced by the automotive industry and the impact these other changes may have on a manufacturer's ability to improve fuel economy. Tighter emissions standards are likely with the amendment of the Clean Air Act. Tighter standards have already been adopted in California, where the adoption of a 0.4 gram per mile oxides of nitrogen (NO_x) standard has already resulted in some loss in fuel economy for some manufacturers.

I should also point out that the diesel automobile, which provides significantly better fuel economy than its gasoline counterpart and is the engine type in many of the "high-mileage prototypes" that have been highly touted, cannot meet a NO_x standard much below 1.0 gpm. Tighter standards may make this engine type unavailable.

Based on the Montreal Protocol, there is a strong push to eliminate CFC use, which we strongly support. However, the leading substitute for auto air conditioner coolant is less efficient and will likely require larger compressors and greater air flow for proper operation. Therefore, improvements in aerodynamics and the attendant fuel economy benefits may be lost. The larger compressors will require additional engine horsepower with the expected detriment to fuel economy.

In addition, there are numerous changes which will be implemented in the next few years in the area of safety standards, for both cars and light trucks. These include side impact protection for cars and passive restraints for light trucks. Most of these changes will add weight which is, of course, detrimental to fuel economy. Beyond those mandated requirements, anti-lock brakes are being added to more car lines every year and provide a substantial safety benefit, but also increase vehicle weight.

We would also like to address two other specific provisions of the bill, light truck standards and penalty provisions. Applying the same percentage increase requirements to light trucks does not take into account the different functional needs that trucks serve. In spite of the fact that some consumers use trucks primarily as passenger vehicles, trucks must still be designed to carry loads appropriate to their function. More consideration must be given to the functional role of trucks and what fuel economy levels are achievable given this consideration. The current light truck CAFE standards permit this.

We feel that Section 13 of the bill which would amend Section 508(b)(1) of the Motor Vehicle Information and Cost Savings Act to double the penalty provisions should be deleted. Consumers strongly influence what attributes a car should have. Without market pressure to improve fuel economy, this provision would penalize manufacturers for simply meeting demands of the marketplace.

In summary, if Congress is to take any action to improve the fuel economy of the fleet, it must identify steps that will cause consumers to perceive that fuel economy is an important criteria in vehicle purchase decisions. Vehicle manufacturers are driven by consumer demands. If better fuel economy is demanded, manufacturers will meet it. As stated above, CAFE standards have little or no impact on consumer decision patterns and will not be effective in achieving the desired gains in fleet fuel economy. The easy gains in fuel economy have already been achieved. Moreover, increased CAFE standards will only serve as an excuse to avoid or delay implementing real solutions to the problem.

Statement of

Elihu Bergman, Executive Director
AMERICANS FOR ENERGY INDEPENDENCE
Washington, DC

Submitted to the
Consumer Subcommittee
Senate Committee on Commerce, Science, and Transportation

September 7, 1989

Thank you Mr. Chairman for the invitation to present our views on proposals this Committee is considering to increase corporate average fuel economy (CAFE) standards in S-1224.

AMERICANS FOR ENERGY INDEPENDENCE (AFEI) is a non-profit policy organization working to maintain key energy issues on the national policy agenda; provide sound ideas and information about them to individuals and institutions involved in energy decisionmaking; and encourage a constructive national interest approach to the development and execution of national energy policy. AFEI provides a platform for expressing the concerns of individuals and groups from all sectors of American society who share a conviction that energy is a key factor in the maintenance of economic health and national security. We evaluate energy issues, choices, and policies by their contribution to those objectives. For AFEI, energy independence means maximum freedom to function in a global energy system, including freedom from limitations on our energy choices.

AFEI has consistently advocated progressively higher levels of fuel efficiency in passenger vehicles as the most effective measure available for major reductions in U.S. oil demand. And the reduction of oil demand should be the central target of U.S. energy policy because oil consumption continues to be the weak link in our energy system.

After a spell of good fortune in the 80's, our energy independence is once again jeopardized by steadily increasing levels of oil imports. By aiming at the transportation sector which is the major consumer of oil, the proposals under consideration by this Committee would contribute to a reversal of the dangerous reversion to oil dependence. Higher levels of fuel efficiency in the passenger vehicle fleet provide the most promising opportunity for accomplishing this critical objective.

BACKGROUND:

Fifteen years after the major oil consuming nations were ambushed by a collection of oil-producing nations, we are once again headed for the same crossroads where the ambush first occured in 1973. We were ambushed then because the voracious world appetite for oil in the post World War II era of reconstruction and industrial growth -- ours being the biggest appetite -- had transformed the supply/demand equation in favor of the producers. And they asserted their self interest in the form of the highest oil prices the market would bear. For a time it looked like there was no limit to the ceiling.

We were chastened by the energy experience of the mid-70s and early 80's. The combination of economic distress created by the two oil price shocks and the affront to national self-confidence about our ability to control our energy future provided breathing space and an opportunity to make some mid-course corrections in our energy system. There was some turnaround and some progress, influenced both by market forces and by public policy.

The rate of climb in U.S. energy use leveled off. The nation became more efficient in using energy as the amount of energy required to produce a unit of gross national product declined by more than 25%. Oil consumption and imports, which peaked in 1978, bottomed out by 1985. And other forms of energy were introduced as alternatives to oil. As a notable success story for substitution, oil usage to make electricity was reduced by nearly 80% between 1979 and 1988; as much oil saved in the electricity sector alone as the total oil consumption of some of our industrial allies -- France; Canada; Italy; and the U.K.

But from the perspective of 1989, not enough has been done to secure the U.S. energy future for the next 15 years. Whatever the progress of the past 15 years, we still are not secure and we still are vulnerable to the decisions of others. Our dependence on oil continues to be the weak link in the American energy system. We still use too much of it, and consumption is back up; we produce less of it each year; we aren't finding enough oil when we do look; we aren't trying hard enough to locate more domestic oil; and initiatives to explore are increasingly blocked by public concerns about the environmental consequences.

On the supply side, domestic production was down by 4% in the First Quarter of 1989, after slipping 2.1% in 1988. The Department of Energy projects continuing declines for a total production loss of 9.3% between 1987-1990. On the demand side, consumption continues to rise with an increase of about 3% for the First Quarter of 1989, which follows a 1.3% increase in 1988. After bottoming out in 1983, U.S. oil consumption was up more than 9% by 1987.

The difference between domestic production and consumption is filled by imports. For the First Quarter of 1989, imports were up about 18% over 1988. In 1988 they rose by 7% over 1987. DOE forecasts an increase of 10% for all of 1989, and a further rise of 3% in 1990. Between 1987-1990 DOE projects an import increase of nearly 20%.

From a 1977 peak of nearly 50% of consumption, U.S. imports bottomed out in 1985 at 27%. Last year they had risen to 37% of consumption, and DOE forecasts a 42% level by 1990. Some analysts project an even higher level. And DOE's 1987 report on energy security estimated that imports would rise to 50% of domestic consumption by 1995.

The cost of imported oil is the largest commodity item in the burgeoning U.S. balance of trade deficit. In 1987 oil imports accounted for 25% of the deficit at a cost of $44 billion in a $152 billion total. For November 1988 oil ranked higher than automobile imports in the monthly trade deficit figures -- $3.1 billion against $2.1. For 1989, with both the price and quantity rising, oil imports are likely to cost more and account for an even greater percentage of the deficit.

Beyond their impact on the trade deficit, rising imports impose a greater security cost on the United States by elevating the importance of Persian Gulf oil. Though oil from the Gulf is not the critical factor in U.S. requirements contrasted to those of Japan -- 60% of Japanese consumption -- it once again is increasing in importance. In 1988 U.S. oil imports from Persian Gulf sources were up by nearly 400% from a 1985 low (1985 -- 472 MBD; 1988 -- 1,828 MBD.) At their low point in 1985, Gulf imports accounted for 3% of total U.S. consumption; in 1988 they were up to 11%.

The U.S. commitment to protect Gulf oil fields, as a major factor in our strategic position in Southwest Asia, was tangibly reaffirmed in the reflagging and escort operations during 1987-88. It has been estimated that these operations alone added $40 million a month to U.S. military obligations in the region, which totalled $14.6 billion for 1987. This security load adds a premium to the cost of each barrel of oil we import from the Gulf.

THE OUTLOOK:

Looking toward the future there is a high degree of consensus among the institutions and individuals who project future energy scenarios. And the images in their crystal balls are not encouraging for a secure energy future. The temporary spell of good fortune we enjoyed in the 80's as the result of oil gluts and low prices will gradually dissolve in the 90's from the impact of increasing oil import dependence.

In 1987 the Department of Energy report on energy security forecast that by 1995 a 50% drop in domestic oil production coupled to steadily rising consumption would translate directly into a 50% increase in imports. At current rates of consumption, this requirement would add about 3 million barrels a day to demand in the world oil marketplace.

Looking farther ahead a recent Gas Research Institute Projection of U.S. Energy Supply and Demand to 2010 forecasts an import level of 12.4 MBD by 2010, double the current level, and the equivalent of 75% of current consumption. The GRI projection is based on a steady climb in total U.S. energy consumption for a 25% increase over the next 20 years. Even assuming these steadily improving efficiencies, GRI forecasts higher levels of energy demand in all sectors -- residential; commercial; industrial; and transportation. And even with increased consumption of the alternative energy sources -- coal; natural gas; nuclear; and renewables -- oil demand would continue to rise.

Within the GRI twenty year outlook and comparable forecasts from other sources, the nation's increasing energy demand can be fulfilled by domestic resources, except for oil. Our increasing oil demand and the higher import levels required to meet it place us directly in harm's way. This is because our steadily increasing oil import requirements would be a major factor in restoring OPEC's discretionary power over production and prices, which they exercised for a time in the 70's without restraint. The sudden and sharp price increase triggered a wave of economic adversities that were major contributors to the recession of the early 80's. At that time, U.S. import requirements had peaked at about 50% of our needs. A return to that threshold would expose us to a repeat performance.

OPEC's apparent disarray should not conceal their potential for rising again. Their undisciplined behavior -- the cheating; price cutting; and feuding -- was the result of cutthroat competition for shares in a declining oil market, created by a combination of lower world consumption and more alternate supplies from non-OPEC producers who likewise were hustling for market shares. By 1982, most of the individual OPEC countries needed to sell more oil than the world needed from them, and in the process of attempting to do so, organizational discipline became irrelevant. It was every man for himself. As this condition turns around and the world needs more OPEC oil than they need to sell to meet income requirements, OPEC once again will be able to resume both the image and reality of organizational solidarity that they exercised during the bonanza days of the 70's.

The margin is slim between today's buyer's market and the seller's market that would restore OPEC's clout. The OPEC countries currently are producing about 19 million barrels a day. This is not a high enough level to satisfy the revenue needs of all members. However, a production level of about 22-24 million barrels a day should generate the needed income. The difference is 3-4 million barrels a day of demand. Anything above that provides OPEC with discretionary power to set the price for each additional barrel. And the projected increase in U.S. demand alone would be enough to close the gap.

In addition to U.S. requirements, oil demand is rising in our industrial allies. Together we currently account for about 75% of the world's oil demand, and our collective requirements can accelerate the restoration of OPEC's market advantage.

But beyond the developed countries, the energy requirements of the Third World are emerging as the major factor in the future energy outlook for all of us. The less developed countries account for 75% of the world's population. Though in some places, such as India and modernizing Asian countries, growth rates are levelling off, annual population growth in the Third World ranges from 2.1 percent in Asia through 2.2 percent in Latin America to a high of 2.9 percent in Africa. These rates would result in a doubling of this 75% of the world's population in 30 years.

Contrasted to the developed countries where energy demand rose by a modest 6% between 1973-87, LDC demand exploded at the rate of 96%. In China alone, with 22% of the world's population, and embarked on a crash modernization effort, energy demand increased by 93%.

And within their energy systems, the LDCs are even more reliant on oil as a fuel source. While oil accounts for 65% of the energy used in developed countries, for the Third World with access to fewer alternatives, it accounts for 71%. And like overall energy demand, Third World demand for oil is rising sharply. While oil demand in the developed countries actually declined by 11% between 1973-87, it was up in the LDCs by 62%. Granted that much of this demand surge came from oil-producing LDCs who used more of their own production for refining. But the non-producing LDCs were a significant factor in the rise.

With their high growth rates both in population and energy, and the continuing internal and external pressures for more rapid modernization, the Third World will be an increasing source of pressure on the global energy supply system.

WHERE DO WE GO FROM HERE?

This ominous prognosis begs the question of how the United States addresses the prospect of an insecure energy future within the next twenty years, and if indeed we have the capability to deal with it. For doing so, the principal target is obvious-- it is a revival of oil dependence created by rising consumption coupled to decreasing domestic production. The widening gap is closed by imports, more of them from the rich Persian Gulf producing areas, which contain more than half the world's proven oil reserves.

To slow down, if not halt, this threatening reversion to a state of oil dependence, the United States should aim for a consumption level in which imports account for no more than 25%. At this level, we enjoy the advantages of a buyers market, with the opportunities to bargain, select sources of supply, and make deals in our interest. We know from recent historic experience that the higher import levels, toward which we are heading, deliver us into the hands of the foreign producers.

There are a number of things we can do to get there. On the demand side there still are untapped possibilities for reducing oil consumption by greater efficiencies and substitution of alternatives to oil. Accounting for 60% of our oil consumption, the transportation sector is our most promising conservation bonanza. And transportation is especially attractive since it has made the least progress in increasing efficiency: Between 1979-87, total U.S. energy consumption was down by 10.8%; in the industrial sector by 20.5%; and in the residential/commercial sector by 6.9%. But in transportation, energy usage (all of it oil) was up by 3.2%.

The achievement of significant savings and efficiencies in the transportation sector would be a major asset in reversing our reversion to oil dependence. We would recommend a target that doubles the fuel efficiency of our passenger vehicle fleet by the year 2000. Last year the average performance was about 18 miles per gallon. Increasing fuel economy (CAFE) standards to a level that will achieve 36 miles per gallon would yield substantial savings in gasoline consumption that could reduce oil demand by as much as 3 million barrels a day.

And it is likely that the American public would support government action in this area. Some recent readings of public opinion on energy issues challenge the prevailing conventional wisdom that only surging prices and gasoline lines capture public attention. The public opinion surveys disclose that while energy may not rank among the top ten issues, Americans are aware; do care; are worried; and willing to do something about it.

In May of this year, the Cambridge Reports National Poll found that 80% of the sample agreed that the U.S. energy supply problem is either "very" or "somewhat" serious. The "very" serious category alone had risen sharply to 48% from 33% a year earlier.

And two polls conducted last year found similar concerns. A national survey sponsored by the League of Women Voters Education Fund found that 63% of the respondents believed an energy shortage was likely in the next ten years. This poll conducted by the Gallup Organization in December 1987 came up with findings that closely resembled an earlier Wall Street Journal/NBC News survey at the start of the oil price collapse, which found 80% of the sample did not believe low prices would last. In common, both surveys disclose a public skepticism about the national energy future even when today's news is good. And both also found a willingness to pay more to increase energy security. In a breakdown of "public interest leaders" the League survey found that 100% of the respondents supported higher fuel economy standards and 72% favored an increase in the gasoline tax.

Another survey conducted for The Communications Consortium, a Washington-based public interest group, found similar public anxieties. Of those polled, 67% said an energy crisis -- like gasoline shortages, sharply higher prices and oil supply disruptions-- will happen again.

It is abundantly clear that if we do nothing and stand still, we are going to be in big trouble. And with the long lead times in energy matters, the time to do something effective is getting short. The proposal before this Committee could be a key building block in securing our energy future, and we encourage you to move forward with it.

Thank you, Mr. Chairman.

STATEMENT OF THE

AMERICAN INTERNATIONAL AUTOMOBILE DEALERS ASSOCIATION

TO THE UNITED STATES SENATE
COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION, CONSUMER SUBCOMMITTEE

CONCERNING S.1224,
THE MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989

The American International Automobile Dealers Association represents the 9,500 franchised new car and truck dealers who market imported vehicles in the United States. Our members and their 240,000 employees sell and service imported automobiles and trucks in the United States, as well as the domestically produced vehicles by these importers. We appreciate this opportunity to address the Consumer Subcommittee on our views of S.1224, a proposal to increase the Corporate Average Fuel Economy (CAFE) standard.

S.1224 will require each manufacturer and importer to improve its CAFE by 20 percent beginning with 1995 model year cars and light-duty trucks, and 40 percent by model year 2001. It will also double current fines for failure to comply.

The stated intent of S.1224 is to reduce both the U.S. dependence on foreign oil and the amount of carbon dioxide emitted into the air by automobiles. We believe that these are laudable goals and should be addressed in a manner that is effective and cost-efficient. Our concerns lie in the unrealistic and discriminatory percentage increases required by the bill. We feel that this bill would inflict serious harm upon American small businessmen, forcing many of our member dealers to close their business and resulting in a significant loss of jobs.

S.1224 is ill-conceived legislation. It will fail to achieve its intended goals, unjustly penalize present achievement of high fuel economy and destroy any incentives for progress in future fuel economy technology. S.1224 also has serious implications for U.S. trade relations.

I. Government-mandated cars will seriously affect an imported automobile dealer's ability to survive in today's market.

As policy, S.1224 is self-defeating. This legislation may succeed in forcing fuel economy technology on automobile manufacturers at a great cost, but it will ultimately fail to meet its intended goals because in our free market economy consumers cannot be forced to purchase those vehicles. Forcing technology that has not been fully developed, and at a pace which leaves no room for manufacturers to prepare or adjust production schedules, will require dealers to sell cars that are too expensive and have neither the performance characteristics nor the room that customers desire. This will leave a tremendous burden on dealers to sell cars that few people want to buy.

Because of the wildly disproportionate effect that percentage increases in CAFE (as opposed to numerical increases) will have on the various manufacturers, dealers of imported automobiles will be restricted to a limited class of vehicles. Japanese and European manufacturers will effectively be forced out of the mid-sized and luxury automobile markets. Potential customers will simply look elsewhere (most likely to less fuel efficient domestically manufactured vehicles) for lower priced vehicles with more power and interior space, defeating the original intent of this legislation. This will unfairly, and without basis, put imported automobile dealers at a competitive disadvantage. Some limited-line manufacturers could even be shut out of the U.S. market completely.

II. S.1224 penalizes success while destroying future incentives.

Importers as a group have done the most to develop and successfully market fuel efficient automobiles, having been in the forefront of fuel economy research and development. They have introduced turbochargers and superchargers, to prcvide additional horsepower for small engines without increasing fuel consumption.

And they have developed multi-valve technology. providing improved fuel economy with greater horsepower. The major Japanese manufacturers all have CAFE levels in the low 30's, as compared with domestic companies which will barely meet the minimum standard of 27.5 miles per gallon for 1990.

With percentage increases instead of flat, numerical increases in the CAFE, this bill penalizes those who have invested the most in fuel economy technology and have subsequently achieved the highest fleet averages, well above that required by the present CAFE standard. It demands the least from the largest segment of the market (domestically manufactured vehicles comprise approximately 70 percent of the U.S. automobile market), while making disproportionate demands on a relatively small market segment that has led the industry in attaining superior fuel economy standards.

The use of percentage based CAFE increases clearly sends a message to manufacturers, domestic and import, which is counterproductive to future improvements in fuel economy technology: Exceed the standard and the United States government will make your compliance even more difficult in the future. And this message could spread to well beyond just the automotive industry. S.1224 could set a precedent for all industries facing the prospect of government regulation. Furthermore, this legislation would have the unintended effect of stifling the creative genius that may some day help solve future pollution and fuel economy problems.

III. CAFE increases will have a de minimis effect on global warming; other solutions are more effective and cost-efficient.

Legislation to address global warming should be global in scope. Efforts to reduce CFCs and restrict deforestation on a world-wide basis can have a much greater impact on global warming than the mere effect of increasing the CAFE in the United States. This legislation fails to recognize the potential of those issues, instead placing the entire burden on one segment of the U.S. economy. The United States has taken a world leadership role in regulating its automotive industry with introduction of CAFE standards and the 1977 Clean Air Act, and will continue to show that leadership with the impending passage of legislation to renew the Clean Air Act. As a result, the United States will have some of the most stringent emissions standards in the world.

Real solutions to global problems must include international cooperation. To assert that these CAFE increases alone will effectively address our global warming problems is inaccurate and will create a false sense of accomplishment.

IV. A carbon fee is a more effective and comprehensive method of reducing CO_2 emissions.

One of the most efficient ways to reduce emissions of carbon dioxide is through a carbon fee. A carbon fee is a free market solution to a fundamental market issue. As seen in the 1970s, a substantial increase in the cost of gasoline will increase the demand for more fuel efficient vehicles and reduce the total number of miles driven. Increases in the CAFE standard, however, do not provide the customer any incentive to reduce fuel consumption. Instead, it limits choice and artificially increases the price a customer will pay for the average automobile.

S.1224 would affect less than one-quarter of all carbon dioxide emissions in the U.S., while a carbon fee would reduce more carbon dioxide emissions and encourage energy conservation in all sectors of the economy.

Moreover, CAFE only applies to new model vehicles, having no effect on the millions of cars and trucks already on the road today. While older cars account for only about 40% of the miles driven in America, they account for 90% of the hydrocarbon and carbon monoxide emissions. A carbon fee would impact every automobile on the road immediately, as opposed to a six year delay with S.1224. Furthermore, substantial revenues would be raised with the fee; and U.S. gasoline prices would be brought into line with world prices.

The development and use of reformulated gasoline is another free market solution to the problem of carbon dioxide emissions. Again, cleaner burning gasoline would have the benefit, not found in S.1224, of affecting all vehicles on the road immediately.

V. No change in existing CAFE standards is warranted.

When considering the progress made since the 1970s to increase fuel economy and the reductions in emissions required by the 1977 Clean Air Act, it is clear that the automobile industry has made significant reductions in its pollution. If proposals similar to those found in the Administration's Clean Air bill become law, the automobile industry will face further reductions in vehicle emissions. These drastic emissions reductions, coupled with the increased demand for safety features, have a negative impact on fuel economy. The large percentage increases in CAFE required by S.1224 do not take those factors, as well as the crucial factor of consumer demand, into consideration.

Furthermore, CAFE increases will have a de minimis effect on global warming. The commitment recently shown by President Bush and Congress to renewing the Clean Air Act show the world that the United States is determined to protect the world environment. This display of world leadership in environmental protection should be a major bargaining chip in efforts to convince other nations to reduce their share of global warming.

The automobile industry should not be made scapegoat when other, more sound policy solutions are readily available. Nor should the imported automobile industry be required to bear the burden for the entire U.S. automotive industry's pollution problems.

VI. S.1224 would unfairly discriminate against imports and violate GATT.

A percentile CAFE increase would constitute a blatant non-tariff barrier, since it would establish discriminatory and far more stringent fuel economy standards for imported vehicles than it would for domestically produced automobiles. The major imported automobile companies would face CAFE requirements of more than 44 miles per gallon by the year 2001, while domestic manufacturers would only be required to reach approximately 39 miles per gallon.

The major imported automobile manufacturers presently maintain higher fuel economy standards by employing most, if not all, available technologies. The opportunity for large improvement in their fuel economies, therefore, is severely limited in comparison to the domestic manufacturers who do not employ all existing technologies. Furthermore, percentage increases would require these manufacturers, who have consistently provided fuel efficient cars, to numerically increase their fuel economies more than the domestic manufacturers.

Additionally, the so-called "cap" on the percentage increases is set unrealistically high. In fact, it serves as no true cap at all. Only limited line importers will exceed the 40 miles per gallon cap by 1995. No full line car makers or importers will approach the so-called cap under the bill. No cap should exceed an amount which would represent a twenty percent increase over the 1989 standard. This would treat more fairly those manufacturers who have presently attained the highest fuel efficiency; and it would continue to provide import manufacturers an incentive to meet or exceed the new standard.

The proposed percentile increase would violate the international obligations of the United States under the General Agreement on Tariffs and Trade (GATT). Article II (4) of the GATT provides that national treatment should be provided for all requirements affecting the internal sale of products. The percentile increase technique, however, would have the effect of discriminating against imports and would deny national treatment. Furthermore, the Agreement on Technical Barriers to Trade signed by the United States in 1979 requires that the United States not impose standards on technical regulations which have the effect of creating unnecessary obstacles to trade, which the proposed CAFE standard would do. In short, S.1224 is discriminatory, denies national treatment, and would be import-limiting in effect.

Driving the European and Japanese manufacturers out of the mid-size and luxury car markets would be very expensive for the American consumer and would fuel inflation. Domestic manufacturers, free of price competition in those markets, would predictably raise prices on their mid-size and luxury models. The additional costs to consumers sure to result from this could be as great as the expense of the Japanese voluntary restraint agreement, which costs U.S. car buyers as much as $12 billion each year.

VII. Any change in the present CAFE standard MUST BE FAIR TO ALL.

A. Any change in the present CAFE standard must be based upon that standard, not on the individual level of performance that has been achieved by the various manufacturers. Percentage based CAFE standards penalize the most responsible manufacturers without fulfilling the intent of the legislation. As it stands, S.1224 is fundamentally biased.

B. Congress should not mandate solutions when free market answers are available. The free market has always provided the best solution to market issues (one example is the industry's response to the 1970s oil crisis) and it will continue to do so, if allowed. At the very minimum, manufacturers must be granted the opportunity to use alternative methods other than CAFE to achieve the goals of this legislation.

C. If the Subcommittee is intent on using percentage increases, it must also allow credit for historical performance by the individual manufacturers. Without credits, major import manufacturers would be forced to drastically and immediately alter their production schedules, causing great hardship on these companies and the thousands of dealers who rely on their products.

D. Finally, and very importantly, this legislation must include an exemption for limited-line manufacturers who sell less than 100,000 units annually in the United States. The percentage based CAFE increases would destroy dealers of those limited lines while having a trivial impact on global warming. Percentages set so unreasonably high for these manufacturers can only be seen as an attempt to put them out of business in the United States. At a time when the U.S. is striving to keep European markets open as the European Community moves closer to economic integration, such a blatant restriction of the U.S. automotive market would only serve to damage U.S. interests in the E.C.

Instead of the unrealistic percentage increases, these manufacturers should be given a free market incentive to produce more fuel efficient vehicles that are realistically within their manufacturing and marketing capabilities.

We thank the Subcommittee for this opportunity to express our views on S.1224 and look forward to working with the Subcommittee to achieve legislation that will responsibly and equitably address the genuine concerns presented by fuel economy and the global warming issue.

COMMENTS OF AMERICAN SUZUKI MOTOR CORPORATION
ON
S.1224 "THE MOTOR VEHICLE FUEL EFFICIENCY ACT OF 1989"
SUBMITTED IN CONNECTION WITH
SEPTEMBER 7, 1989 HEARING
OF THE
CONSUMER SUBCOMMITTEE OF THE
SENATE COMMERCE, SCIENCE AND TRANSPORTATION COMMITTEE

American Suzuki Motor Corporation ("ASMC"), with headquarters in Brea, California, respectfully submits the following comments concerning S.1224, "The Motor Vehicle Fuel Efficiency Act of 1989," in connection with the September 7, 1989 hearing of the Senate Consumer Subcommittee. ASMC is the authorized importer and distributor in the continental United States of Suzuki automobiles imported from Japan and Canada.

ASMC's parent company, Suzuki Motor Co., Ltd., for years has made fuel efficiency a top corporate goal and a primary ingredient of its marketing strategy. Reflecting this commitment, Suzuki-produced automobiles have received the number one fuel efficiency rating from EPA for model years 1986-1990 in both the passenger car and the gasoline-powered light truck categories. ASMC understands the desire for further improvements in automobile fleet fuel efficiency because of concerns about oil imports and global warming. ASMC does not oppose legislation to advance these goals, as long as (a) the same requirements are applied to all manufacturers, and (b) the requirements are fair and effective.

However, ASMC submits that S.1224 is not an appropriate means to achieve these goals. The bill's percentage-over-1988-achievement approach is unfair especially to recent market entrants such as ASMC. The bill's approach is harmful to Congress' interest in fleet fuel efficiency, American consumers, and the long-term competitiveness of the domestic auto industry. Also, S.1224 violates the United States' obligations under the General Agreement on Tariffs and Trade.

I. Background

During the period since the enactment of CAFE requirements in 1975, the fleet fuel efficiency of the U.S. automobile fleet has increased substantially. Asian imports have contributed greatly to this increase in fuel efficiency. While part of the reason for imports' fuel efficiency is that imported vehicles are, on average, smaller and lighter than automobiles produced by Detroit's Big Three, there is no doubt that a major reason for the greater fuel efficiency of imports is the more aggressive development and application of advanced technology by foreign producers. This has been demonstrated through the analysis of Congress' Office of Technology Assessment.[1] The same point has been recognized by Deborah Bleviss, a well recognized independent student of this issue:

> . . . Japanese manufacturers can clearly claim the honor as all-round leaders in fuel economy innovation. Not only do they have a strong presence in every component of such innovation -- for example, engines, transmissions, and so on -- but they also have a presence in virtually every advanced technology within these components.
>
> . . . [There is] a greater willingness by Japanese automakers to bring the fruits of their research . . . into production relatively quickly. . . .
>
> . . . .
>
> Compared to their industrialized competitors who are at the forefront, American light-vehicle manufacturers appear to be at the "back of the pack" in the race to develop more efficient technologies.

Deborah Lynn Bleviss, The New Oil Crisis and Fuel Economy Technologies 127, 132 (Quorum Books 1988)("Bleviss").

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[1] See Statement of Stephen E. Plotkin, Global Warming and Cafe Standards: Hearings on S.1224 Before the Subcomm. on the Consumer of the Senate Comm. on Commerce, Science and Transportation, 101st Cong., 1st Sess. 71-73 (1989) ("May 2, 1989 Hearing").

In addition, Senator Albert Gore Jr. -- during the September 7 hearing -- recognized this fact, indicating that imports "have gone farther on efficiency improvements . . . ."[1]

Suzuki's experience epitomizes the fuel efficiency of imports, but also presents a unique situation that would be very adversely impacted by S.1224. Suzuki has had as a long-standing corporate goal the manufacture of highly fuel-efficient passenger cars. In a market where there are a number of competitors, Suzuki has concentrated on its expertise in this area to develop and maintain a market niche. Beginning in the 1986 model year, Suzuki produced fuel-efficient passenger cars for General Motors which have won the number one EPA mileage rating each successive year. First, it was the Chevrolet Sprint, which in 1986 had an unadjusted 61.5/76.4 mpg rating, in 1987, 59.7/74.5, and in 1988, 59.7/74.5. In the 1989 and 1990 model years, it is the Suzuki-produced GM Geo Metro, with a 59.2/74.7 unadjusted EPA rating that leads the country in fuel efficiency.

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[1] Preliminary Transcript of Hearing before the Consumer Subcommittee of the Committee on Commerce, Science and Transportation of the United States Senate, Hearing on Corporate Average Fuel Economy (S.1224), September 7, 1989 at 47 ("Prelim. Tr.").

Apart from Suzuki's production for GM, in model years 1985-88 a very small number of Suzuki-produced passenger cars -- similar to the vehicles produced for GM -- were sold under the Suzuki brand name by independent distributors in Hawaii, Puerto Rico and U.S. territories. No Suzuki-brand passenger cars were sold in the continental U.S. in those years. It was on the basis of these very limited sales that Suzuki was assigned a CAFE number of approximately 50 mpg by EPA for model year 1988.

In model year 1989, ASMC launched the sale of passenger cars under the Suzuki name in the continental U.S. with a new passenger car model line. This new model line is the Suzuki Swift. The Swift is a subcompact model and very fuel efficient (one version has the seventh highest EPA mileage rating for model year 1990). However, the Swift is slightly larger and heavier than the earlier Sprint, and uses a 4 cylinder engine in contrast to the Sprint's 3 cylinder engine. For this reason, ASMC expects that, when finally calculated, its passenger car CAFE for 1989 will be approximately 37 mpg.

Suzuki achieved its high mileage ratings by using advanced technology to improve engine and drive train efficiency and aerodynamics, and to reduce overall weight while maintaining substantial passenger/cargo space. For instance, Suzuki developed the most fuel efficient automobile through the use of a small 1.0 liter engine, light weight materials, advanced technology, and innovative component design approaches such as hollow camshafts and crankshafts. (See attached chart for a more detailed profile of Suzuki's application of advanced technology.)

For model year 1990, Suzuki expects to begin production of passenger cars at a plant in Ontario, Canada which is operated as a joint venture between Suzuki and General Motors. ASMC expects to import and distribute Suzuki Swifts produced in Canada.

Suzuki plans over the next few years to introduce several additional passenger car models. These new models are absolutely necessary if Suzuki is to survive in the U.S. auto market. Without a significant market presence, Suzuki will find it difficult, if not impossible, to attract and maintain a viable dealer network to handle its automotive products. Consistent with Suzuki's expertise, the new models it plans to introduce are expected to be relatively small and highly fuel efficient. However, in order to meet consumer needs, such cars are likely to be somewhat larger and -- though more fuel efficient than competitors' comparable automobiles -- less fuel efficient than Suzuki's existing models.

S.1224 would adversely impact ASMC and other new market entrants by freezing them in the smallest-car segment of the market. For similar reasons, it would also negatively impact Suzuki with respect to light trucks. For these and other reasons, S.1224, would be unfair to ASMC and harmful to a variety of interests Congress seeks to protect.

II. The Percentage Approach is Unfair and Counterproductive

A. S.1224 Unfairly Penalizes Those Who Have Accomplished the Most

The approach of requiring each manufacturer to increase its fleet's fuel efficiency by a percentage over its corporate average fuel efficiency level achieved in 1988 is a radical departure from traditional legislative approaches. It would require companies which achieved higher fuel efficiency levels in 1988 to achieve new levels higher than other manufacturers, involving both greater absolute increases than required of other manufacturers and an ever-widening disparity between them in fuel efficiency. This approach is certainly very different from all other legislation affecting automobiles, such as safety or emissions requirements which impose the same standard on all manufacturers.

The only argument that has been offered in support of S.1224's approach is that it requires all manufacturers to make an equal effort to improve fuel economy. However, this is fallacious reasoning. Manufacturers have not made equal efforts in the past, and this bill would impose a requirement of greater efforts on those who have, by any objective assessment, made the greatest efforts in the past. As Congress' Office of Technology Assessment has recently pointed out:

> [T]he structure [of S.1224] ignores the fact that at least a portion of the current differences in companies' CAFEs are due to . . . the companies' different efforts at moving advanced technology into their fleets. Thus, this type of standard penalizes manufacturers who have tried the hardest to increase their fleet fuel efficiency in the past. They now have the most difficult technological challenge, because they have already "used up" a larger portion of the technological headroom available to them from off-the-shelf technology. Companies that have hesitated to use the best available technologies -- the companies we would like to motivate the most -- are instead rewarded by being presented with the lowest efficiency target. [emphasis added]

Memorandum of Steven E. Plotkin, Senior Associate, Office of Technology Assessment, to Linda Lance, June 22, 1989.

Sen. Gore made a similar point at the September 7 hearing, noting that ". . . the real situation . . . is that .

. . [imports] have gone farther on efficiency improvements and, therefore, the . . . easier gains are not as readily available to them . . . ." (Prelim. Tr. at 47.)

For these reasons, S.1224 would unfairly penalize companies, including ASMC, which have a very good record on fuel efficiency and have achieved it through great effort.

B. S.1224 Undermines Fuel Efficiency Goals

Although its supporters assert that S.1224 is the best approach to improving automobile fuel efficiency, in fact it would undermine fuel efficiency goals in several ways.

First, it would inhibit companies from exceeding their minimum required CAFE levels in the future for fear that such improved performance might become a new, onerous benchmark for future requirements. This would be a very reasonable fear, and it would apply to all auto manufacturers. Those companies which did the least in the past to increase their fleet's fuel efficiency would fare the best under S.1224. Those which would face the lightest burdens are the manufacturers which for 1988 did not even meet the statutory requirement of 27.5 miles per gallon (including one of the domestic Big Three). These companies would have strong reasons to continue taking a minimum approach and to avoid exceeding the CAFE levels required by S.1224, for fear that fuel efficiency achievements in the future will become a new benchmark for required improvements. In fact, if the S.1224 approach were to be adopted, automakers might well be concerned about exceeding other minimum requirements, such as in the emissions area, for fear that the S.1224 concept might be adopted elsewhere.

Second, the interaction of S.1224 with some consumer preferences could well lower the overall achieved fuel efficiency of the fleet. Consumers may well choose to purchase automobiles from manufacturers with lower CAFE requirements. As stated by Congress' Office of Technology Assessment:

> [T]here is the possibility that consumers may not place a high value on the increased levels of fuel efficiency, and thus may tend to prefer lower efficiency vehicles from the "favored" companies, because their price tags don't include the costs of the most advanced technologies. Also, it is possible that companies that wind up with the lowest efficiency targets could use the leeway these lower targets afford them to increase vehicle performance to levels that companies with higher efficiency targets may not be able to match (because higher performance reduces fuel efficiency).

Memorandum of Steven E. Plotkin, Senior Associate, Office of Technology Assessment, to Linda Lance, June 22, 1989.

Significantly, the power of consumers to cause a lower overall fleet fuel efficiency was the basis for the requests made by domestic manufacturers to the Department of Transportation to lower the CAFE requirements for model years 1985-88. Since S.1224 would impose lower CAFE requirements on some manufacturers, this would allow such manufacturers to produce less efficient cars which consumers are likely to prefer. Overall, the result undermines the goal of improved fuel efficiency and fleet carbon dioxide emissions reduction.

Third, while some concern has been expressed about fuel-efficient manufacturers' upsizing their vehicles, which has been referred to as "backsliding," the effort to prevent this through S.1224 will be counterproductive as to fuel efficiency. S.1224 will prevent manufacturers with higher CAFE ratings (such as Suzuki and other importers) from upsizing (to subcompact, compact or mid-size automobiles, depending on the manufacturer), and, for some, may even require further downsizing. This would exclude Suzuki -- producer of the highest mpg cars -- from competing fully even in the subcompact segment of the market. More generally, it would exclude from major segments of the auto market the manufacturers which have been most aggressive in improving fuel efficiency. Given the needs of many consumers for mid-size cars, such cars will continue to be purchased. The net effect of S.1224 would not be to reduce the number of such cars sold, but only to assure that they are produced by companies with the least fuel-efficient fleets. This result undermines the goal of improving overall fleet fuel efficiency.

It is counterproductive and perverse to exclude from certain segments of the automobile market those manufacturers with the greatest demonstrated capacity and resolve for achieving fuel efficiency improvements. If Congress decides as a matter of policy that mid-size and large cars should not be provided to the American public, that is one thing. However, to exclude the most fuel-efficient manufacturers from these segments of the market by burdening them with higher CAFE requirements would -- wholly apart from equitable considerations -- undercut the goal of having each size automobile produced for American consumers be as fuel efficient as possible.

For these reasons, adoption of S.1224 would not have the beneficial effects of reducing carbon dioxide emissions and the need for oil imports to the extent predicted. Additionally, as discussed below, S.1224 would undermine other significant interests.

C. S.1224 Harms Consumer Interests

As a corollary to the points discussed above, S.1224 would harm the interests of American consumers by restricting competition. As noted by Congress' Office of Technology Assessment,

> Because their fuel economy targets are based on the 1988 makeup of their fleets, automakers who now focus on small cars will have great difficulty in changing their mix towards larger cars. This would lessen competition in an important segment of the market.

Memorandum of Steven E. Plotkin to Linda Lance, June 22, 1989.

The effect of new entries into the U.S. auto market over the past twenty years has brought great benefits to American consumers by providing new product offerings and by putting much greater competitive pressures on the Big Three to be responsive to consumer interests. Because S.1224 would make it difficult for additional entrants to compete with the Big Three in the mid-size market, it will harm consumer interests. It will provide fewer choices. And -- by giving the Big Three the security of knowing they need not fear competition in that market segment -- it will, as history reminds us, reduce the critical competitive pressure needed on those manufacturers to improve their product offerings. The study by Deborah Bleviss concludes that the rate of development of new fuel economy technology is closely tied to the level of competition in a particular market segment. See Bleviss at 142-146. Thus S.1224 will be prejudicial to consumer interests by limiting choice not only with respect to various fuel efficiency approaches but also with respect to other product features.

The goal of fuel economy legislation should be to put manufacturers in the same position so that they can compete fully across the board. Our economic system is based on the benefits of competition.

D. S.1224 Would Harm the Long-Term Competitiveness of the U.S. Automobile Industry

A major concern expressed in the U.S. these days relates to the extent to which the American economy has suffered from U.S. producers having foregone opportunities in the past to develop or apply advanced technology in a number of areas. (For instance, American auto makers had for many years declined to compete for the small car segment of the auto market.) American analysts attribute some of this to the tendency of American industry to focus on the short run. See Bleviss at 149,155.

In this connection, Sen. Albert Gore, Jr., expressed the view at the September 7 hearing that S.1224 could undermine the long-term competitiveness of the American automobile industry. The Senator expressed a concern that, if lower fuel efficiency burdens were placed on the Big Three than on their import competitors, American companies would take it easy while others continue to actively seek improvements in fuel economy. He was concerned that such a difference could leave the domestic companies at a competitive disadvantage in the future.[1] Because developments in fuel economy technology are accompanied by other competitively valuable advances (See Bleviss at 140-142), this could involve a substantial problem for the domestic producers.

Others have expressed a similar, narrower concern, namely, that because domestic auto companies are already behind in developing fuel economy technology, unless they are pushed by government policies to step up their accomplishments in developing fuel economy technology, they will be unprepared for another oil crisis and would suffer substantial market share losses if such a crisis were occur. See Bleviss 229-232.

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[1] Sen. Gore said, "If we enact restrictions that [have] the longer-term effect of forcing only foreign manufacturers to make the next generation of efficiency improvements, might we face the situation a few years from now where our manufacturers have taken the easier route and . . . because [foreign manufacturers] are under the extreme pressure, they make the big leap to new advances and all of a sudden they come to our shores with dramatically more efficient vehicles, the next generation of technology, and we are right back in the soup with American manufacturers at a disadvantage." Prelim. Tr. at 48.

III. S.1224 Violates the General Agreement on Tariffs and Trade

S.1224 would violate the General Agreement on Tariffs and Trade ("GATT'),[4] because it would place greater burdens on Asian auto producers than on domestic producers.

S.1224 would require a percentage increase in fuel efficiency by each manufacturer above its achieved 1988 CAFE. The 1988 CAFE levels of the three domestic manufacturers ranged from 26.4 to 28.4 mpg. The 1988 CAFE levels of the Asian auto producers ranged from 28.7 to 50 3 mpg. The effect of S.1224, therefore, would be to require Asian producers to achieve higher fuel efficiency targets, and make greater mpg improvements, than the domestic companies. S.1224 would set the 1995 CAFE requirements (20 percent above 1988 levels subject to a 40 mpg cap) for domestic producers at 31.7 mpg to 34.1 mpg, while requiring Asian producers to comply with CAFE levels of 34.4 mpg to 40 mpg. For 2001, the figures would be 37.0 mpg to 39.8 mpg for the domestic companies and 40.2 mpg to 45 mpg for Asian producers. These differences are very substantial.

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[4] The General Agreement on Tariffs and Trade, Jan. 1, 1948, 61 Stat. pts. (5)(6), T.I.A.S. No. 1700, 55-61 U.N.T.S., as amended and restated by, Protocol Modifying Part II and Article XXVI of the General Agreement, Dec. 14, 1948, 62 Stat. 3679, T.I.A.S. 1890; 62 U.N.T.S. 80.

The differential impact that S.1224 would have on domestic and Asian producers is well recognized. Some supporters of S.1224 have a specific interest in preventing the smaller-car Asian manufacturers from producing larger automobiles in competition with domestic producers. Even those who support S.1224 to "prevent backsliding" in the hopes of improving the overall fuel efficiency of the fleet recognize that S.1224 would place higher mpg requirements on Asian imports and therefore would in effect preclude Asian manufacturers from producing larger cars while not imposing the same restriction on domestic producers.

One of the obligations undertaken by each of the GATT's contracting parties is to accord like products from other contracting parties treatment that is no less favorable than that which is accorded domestic products with respect to the application of domestic laws and regulations. Referred to generally as the principle of "national treatment", the obligation imposed on contracting parties by Article III of GATT is as follows:

> 4. The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favorable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use.

S.1224 would violate the principle of national treatment because it would directly impose a demonstrably heavier burden on Asian automobile producers than is imposed on domestic producers with respect to the average fuel economy each would be required to establish for its fleet. It would require Asian producers to meet higher fuel economy standards than domestic companies and would effectively exclude them -- but not domestic producers -- from producing certain size automobiles.

Additionally, Subparagraph 1 of Article III of GATT states that laws, regulations, requirements, taxes and other charges ". . . should not be applied to imported or domestic products so as to afford protection to domestic production". As indicated above, a clear and recognized result of S.1224 would be to afford protection to the domestic automobile industry with respect to the production of larger automobiles.

In addition to violating Article III, S.1224 would also violate United States obligations under the Agreement on Technical Barriers to Trade (the so-called "Standards Code" or "Code"). Article 2.1 of the Standards Code, a sub-agreement that was made a part of GATT, requires signatories to

> ensure that technical regulations and standards are not prepared, adopted or applied with a view to creating obstacles to international trade. Furthermore, products imported from the territory of any Party shall be accorded treatment no less favorable than that accorded to like products of national origin and to like products originating in any other country in relation to such technical regulations or standards. They shall likewise ensure that neither technical regulations nor standards themselves nor their application have the effect of creating unnecessary obstacles to international trade.

Agreement on Technical Barriers to Trade, Jan. 1, 1980, 31 U.S.T. 405, T.I.A.S. 9619.[1]

Thus the Code establishes three distinct obligations. First, technical regulations shall not violate the principle of national treatment by discriminating against imports from signatory countries. Second, there shall be no deliberate creation of technical obstacles to international trade. And, third, the effect of technical regulations shall not create unnecessary obstacles to international trade.

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[1] The terms "technical regulation" and "standard" mean "a specification . . . which lays down characteristics of a product such as levels of quality, performance, safety or dimensions." Id., Annex I, 31 U.S.T. 433.

S.1224 would violate all three obligations. As discussed above, the bill discriminates against Asian manufacturers by effectively precluding them from market segments in which domestic companies are allowed to participate. Second, it would deliberately create obstacles to trade in the sense that one of the very objects of the bill is to prevent those manufacturers with higher CAFE numbers (Asian producers) from producing larger, less fuel efficient cars while not having the same impact on domestic companies. Preventing or limiting foreign manufacturers from selling a product of the type, size, or fuel efficiency of products that domestic manufacturers are allowed to sell constitutes an obstacle to international trade. And third, it is unnecessary to create such an obstacle to foreign producers, as there are other approaches that could be used to legislate improvements in fuel economy. These alternative approaches have not been fully explored.

IV. Conclusion

We appreciate the opportunity to present ASMC's views on S.1224. We would be pleased to work with the Subcommittee to develop ways to achieve its goals without the injurious effects discussed above.

SUZUKI INCORPORATION OF ADVANCED TECHNOLOGY TO IMPROVE FUEL EFFICIENCY

	Suzuki
I. OTA LIST OF ADVANCMENTS	
Front Wheel Drive	Using
Engine Improvements	
4-cylinder/4-valve	Using
Overhead Camshaft	Using
Roller Cam Followers	Not yet
Low Friction Rings/Pistons	Using
Throttle Body Fuel Injection	Using
Multipoint Fuel Injection	Using
Intake Valve Control	Not yet
4-Speed Automatic Transmission	Not yet
Electronic Transmission Control	Using
Aerodynamics, CD 0.37 to 0.34	Using
Tire Improvements	Using
Lubricants (5w-30)	Using
High Efficiency Accessories	Not yet
II. ADDITIONAL LIST OF ADVANCEMENTS	
A. Higher Compression Rated Engine	Using
B. 3-cylinder Engine	Using
C. Aluminum Engine Block	Using
D. Aluminum Rocker Arms	Using
E. Hollow Camshaft and Crankshaft	Using
F. Direct Drive Valve System	Using
G. Lock-up System for 3-Speed Automatic Transmission	Using
H. Body/Chassis Weight Reduction	Using
I. Shift Indictor Light for 5-Speed Manual Transmission	Using

September 21, 1989

STATEMENT OF THE GOODYEAR TIRE & RUBBER COMPANY
ON S.1224,
MOTOR FUEL EFFICIENCY ACT OF 1989
SUBMITTED TO THE CONSUMER SUBCOMMITTEE OF
THE SENATE COMMERCE, SCIENCE AND TRANSPORTATION COMMITTEE

Goodyear appreciates the opportunity to offer its views on the proposed CAFE legislation.

As a major supplier to the automotive industry we have a particular interest in this issue because of its potential burden, not only on our good customers in Detroit, but the U.S. economy as a whole.

At the same time we recognize that those economic issues must be weighed in context with the real need to reduce our energy consumption while seeking a reasonable solution to the global warming problem.

The imposition of more stringent CAFE requirements, however, is not the most effective way to achieve these goals.

The new fuel efficiency standards spelled out in S.1224 are at best unrealistic and potentially costly to the auto industry and its suppliers. Attempts to achieve those CAFE goals inevitably may compromise product safety and sacrifice our competitive position in the world marketplace.

Goodyear is not a newcomer to the CAFE issue. The tire industry, through development of tires with lower rolling resistance, has played an important role in the auto industry's effort to meet CAFE standards.

Since 1975, Goodyear has reduced rolling resistance in tires by some 30 percent, resulting in a 6 percent decrease in fuel consumption.

Through these tire developments alone, a car that obtained 25 miles per gallon could be improved to 26.5 miles per gallon. We're confident that our competitors have achieved similar improvements.

However, as in all things technical, those initial gains were easiest to achieve and the most cost-efficient.

Today, incremental improvements in tire rolling resistance would require a quantum leap in technology -- and that would take time and a considerable investment in research and development.

Tire developments have historically been more evolutionary than revolutionary. Breakthroughs don't happen overnight.

Any meaningful reduction in rolling resistance without the proper time to evaluate the myriad changes in compounds, polymers and constructions, would result in unacceptable compromises in ride comfort and safety.

For example, while a rock-hard compound could result in a major reduction in rolling resistance, it also would drastically reduce the tire's ability to grip the road when the car turns or is being stopped, making the vehicle unsafe to operate.

Domestic auto component suppliers surveyed by an automotive consulting firm, A. T. Kearney, Inc., as reported in the August 21 issue of Automotive News, said they could help automakers meet fuel efficiency goals of 33 mpg by 1995 and 41 mpg by 2000.

However, we discovered that the surveyors failed to address a key question: could this be achieved with existing technology or would it require a technological breakthrough?

As it happens, the conclusions were based more on wishful thinking.

In terms of tire rolling resistance, we've gone as far as existing technology can take us. Technological breakthrough in this area requires funding of a massive research and development effort -- perhaps diverting those dollars needed for investments in periodic expansion and modernizing of existing facilities.

Plants like those in Danville, Va., Union City, TN., and Lincoln, NE., might have a difficult time attracting future investment.

Those are unpleasant consequences in return for only a modest boost in fuel economy.

Nonetheless, Goodyear Chairman Tom Barrett has challenged the company's research department to continue to work on ways to reduce rolling resistance without seriously compromising the quality and safety of the product.

Given the limits of technology, Goodyear joins U.S. automakers in believing that any real long-term solution to energy conservation must emphasize market incentives as opposed to a regulatory approach.

The laws of supply and demand create markets for fuel-efficient vehicles and competitive forces certainly will spur more improvements in fuel economy.

In directly addressing the problem of energy conservation, Goodyear sees the need for a national commitment not unlike the space program of the 1960s or the development of interstate highway systems.

There should be a pooling of the best minds in the industry, academia and government into a Manhattan-type project to provide the quickest results on a cost-efficient basis.

The orderly development of improved automotive fuel efficiency would be only one rung on this ladder to environmental quality -- one step toward a national goal.

-- We need a reliable, uniform program of periodic vehicle inspection to improve the safety of the nation's fleet, but also to force the retirement of many of the nearly 54 million vehicles on the road today that are 10 years old or older. These vehicles make up some 30 percent of the nation's registered autos and an increase in the scrapping rate would significantly improve fuel efficiency not to mention the obvious environmental benefits.

-- Alternative fuels may be an idea whose time has come; unfortunately most of the burden to sell the program has fallen on the auto companies. The government should consider aggressive fleet demonstration programs with government vehicles, using alternate fuels; establish incentives that stimulate consumer interest, and encourage energy producers to expand the availability of these fuels.

-- With concern growing over traffic gridlock in many areas of the country, there should be a program to develop "intelligent" highways to reduce chronic bottlenecks by improving highway designs and thereby reduce both petroleum consumption and tailpipe emissions from idling vehicles.

These are just a few of the approaches that could be considered as part of a national vision -- a unified, long-range strategy to meet the challenges of energy conservation.

We believe that by working together, industry and government could begin to make immediate progress toward a solution.

In this era of intense complex global competition within the auto-related industries, regulatory changes that neglect sufficient lead time for careful product development, create consumer dissatisfaction and abnormal market conditions that may result in the loss of our competitive position, a loss of jobs and a weakening of the entire economy.

We hope these issues are given due consideration as we all continue to explore practical solutions to a very pressing problem.

Thank you.

September 7, 1989

STATEMENT OF MITSUBISHI MOTORS CORPORATION ON SB 1224 SUBMITTED TO THE CONSUMER SUBCOMMITTEE OF THE SENATE COMMERCE, SCIENCE AND TRANSPORTATION COMMITTEE

Mitsubishi Motors Corporation ("MMC"), through its U.S. subsidiary, Mitsubishi Motor Sales of America, Inc. (collectively referred to as "Mitsubishi" hereinafter), manufactures and imports passenger vehicles and light trucks for sale in the United States. MMC also manufactures vehicles for importation and sale by Chrysler Corporation ("Chrysler") through its dealerships in the United States. In addition, MMC and Chrysler, through a joint venture known as Diamond Star Motors, manufacture passenger vehicles in Normal, Illinois, for sale in the United States through both Mitsubishi and Chrysler dealerships. MMC is pleased to have the opportunity to submit comments on SB 1224 for consideration by the Consumer Subcommittee of the Senate Commerce, Science, and Transportation Committee.

As noted in the preamble to the bill, Corporate Average Fuel Economy (CAFE) standards, coupled with the successful response of automobile manufacturers to those standards, have resulted in a doubling of the passenger car fleet fuel economy between 1975 and the present. In particular, Mitsubishi's U.S. passenger car fleet average has exceeded the CAFE standard each year since 1983, the first year Mitsubishi sold vehicles in the United States under its own name (See Attachment 1). In order to achieve these high CAFE levels, Mitsubishi has engineered its vehicles using the latest fuel efficient technologies, including front wheel drive, engine improvements like fuel injection and overhead cam, and aerodynamics.

The preamble to the bill concludes, however, by stating that increased CAFE standards are both reasonable and necessary. The bill then goes on to call for increases of 20 and 40 percent in the 1995 model year and the 2001 model year, respectively. These uniform percent increases are to be based on each manufacturer's fleet average achieved during the 1988 model year.

MMC will not attempt to address, at this time, whether an increase in CAFE standards is necessary. However, if CAFE standards must be changed, MMC believes that the new CAFE standards should be reasonable and that the approach should be fair and equitable to all manufacturers. In addition, the global warming concerns that helped to prompt this legislation should be addressed more broadly to take into account all sources of carbon dioxide, not just the motor vehicle industry.

Regarding the uniform increases of 20 and 40 percent proposed in this bill, MMC believes that (1) the percent increases are generally unrealistic given the currently available technology and (2) this approach is patently unfair in that it clearly penalizes those manufacturers that historically have achieved high CAFE levels ("high mileage manufacturers") while, at the same time, rewarding those manufacturers that historically have achieved lower CAFE levels ("low mileage manufacturers"). For example, high mileage manufacturers would be required to achieve a greater numerical increase in fuel economy than low mileage manufacturers (i.e., 20 percent of 30 versus 20 percent of 20), and in addition, the increase would be technologically much more difficult for the high mileage manufacturers to achieve.

MMC has made every effort to improve the fuel economy of its fleet. Since MMC has already adopted most of the fuel efficient technologies which are currently available, it would be extremely difficult technologically for MMC to achieve significant increases in fuel economy at this time. Therefore, in order for MMC and other high mileage manufacturers to achieve significant increases in fuel economy, downsizing and weight reduction of their fleets, which are already composed of generally smaller vehicles, would be required. This could very well lead to the high mileage manufacturers having to market vehicles with characteristics that may not be acceptable to the public (i.e., less safe, reduced load capability, lower performance, etc.). In addition, the adoption of new materials and the development of new technology, which are not available today, will take considerable time and will likely result in a significant price increase for these more fuel efficient vehicles. Therefore, the end result could be lower sales, rather than higher sales, of these more fuel efficient vehicles, which is contrary to the intended goal of this bill.

On the other hand, low mileage manufacturers, who generally have larger vehicles and who may not have utilized all of the latest fuel efficient technologies in their fleets, can either choose to simply downsize some of their vehicles or increase the percent of their fleets utilizing the latest fuel efficient technologies in order to meet the uniform percent increases proposed in this bill. In addition, they can likely accomplish this without having to invest heavily in research and development.

A direct consequence of this approach is that low mileage manufacturers who have postponed downsizing and adopting fuel efficient technologies will be placed at a distinct advantage in the marketplace over their higher mileage counterparts who have developed and applied fuel efficient technologies much earlier. For example, if one assumes that the market share of each vehicle size class in the attached chart prepared by the Office of Technology Assessment (OTA) remains constant over time, then the high mileage manufacturers who currently produce subcompact and compact vehicles will lose approximately 38.4 percent of their market share in 1995 if they are forced to downsize and shift their production to subcompact and minicompact vehicles. Conversely, the low mileage manufacturers who currently produce both large and midsize vehicles will gain approximately 26.3 percent of the market share in 1995 if they are forced to downsize and shift their production to midsize and compact vehicles.

MMC believes that other alternatives for increasing CAFE offer a more equitable, cost effective approach than the uniform percent increases proposed in this bill. For example, CAFE standards based on vehicle size classes as proposed by OTA[1/] would establish a uniform technological challenge for each motor vehicle manufacturer and create a more level playing field for the industry as a whole. A simple increase in the CAFE target under the current approach would also be more preferable than the uniform percent increases proposed in this bill.

In conclusion, MMC recommends that the committee consider changes to the CAFE standards that are fair to all manufacturers and that provide the motor vehicle industry with the maximum flexibility to meet these new standards.

[1/] See statement of Steven Plotkin, OTA, before the Consumer Subcommittee of the Senate Commerce, Science, and Transportation Committee, May 2, 1989.

Attachment 1

MITSUBISHI CAFE

Model Year	Passenger Vehicle CAFE Standard (mpg)	Passenger Vehicle Fleet Average (mpg)	% Difference
1983	26.0	30.8	+18.5
1984	27.0	31.6	+17.0
1985	27.5	31.9	+16.0
1986	26.0	31.5	+21.2
1987	26.0	31.7	+21.9
1988	26.0	31.2	+20.0
1989	26.5	31.0	+17.0

Attachment 2

Table 5. A FUEL ECONOMY STANDARD BASED ON VEHICLE SIZE CLASS *

Size class mpg goals based on a uniform scaleup from 1988 mpg levels

Size Class	1988 Market Share %	1988 mpg actual	1995 mpg goal
minicompact	.8	37.4	43.3
subcompact	20.4	31.1	36.0
compact	39.2	29.6	34.2
midsize	24.9	26.8	31.0
large	12.9	24.3	28.1
2-seater	1.8	27.2	31.5
FLEET	100.0	28.3	33.0[1]

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[1] Assumes that the size mix of the 1995 fleet is identical to that of the 1988 fleet.

Source: Office of Technology Assessment, based on Oak Ridge data

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* From statement of Steven Plotkin, OTA, before the Consumer Subcommittee of the Senate Commerce, Science and Transportation Committee, May 2, 1989.

September 26, 1989

Ref. No. 526-89C

The Honorable Richard H. Bryan
Chairman, Consumer Subcommittee
Senate Committee in Commerce, Science &
Transportation
SH-227 Hart Office Building
Washington, DC 20510

Dear Senator Bryan,

Subaru of America and Fuji Heavy Industries request that the following statement be included in the record of the Senate Consumer Subcommittee hearing regarding SB1224.

At the outset, we would like to express our extreme concerns regarding any provisions that would require a percentage increase to any manufacturer's reported CAFE mileage as they exist today. Such calculated increase would be particularly damaging to manufacturers who heretofore have achieved and maintained CAFE numbers well above the prescribed federal standard.

Because Subaru has consistently incorportated high fuel efficient technologies, Subaru vehicles have been, and are, among the most highly fuel efficient in the industry. Should such a measure be adopted it would, in our opinion, be regressive and counter productive. Manufacturers of high fuel efficient vehicles would be forced to either adopt some futuristic yet not available technology (which if it ever becomes available would, in all probability, be very costly and thus noncompetitive) or build minicompact vehicles for which there is little or no market demand. The low mileage manufacturers who do not have to take such drastic measures to meet the fuel economy standards will be able to meet market demands, and a market share shift away from the high mileage manufacturers can be expected. Whenever market share shifts occur to low mileage manufacturers (for whatever reason) the fuel economy improvement goal of S.1224 will not be realized. Other approaches to fuel economy improvement should be considered, which requires an even application of technology and maintains competition in the U.S. auto industry.

For the present, we would like to limit our statement to this observation. However, this statement will voice support for concerns expressed by other manufacturers who have historically shown efforts to produce and market fuel efficient vehicles.

Should the subcommittee have any questions regarding this written statement, we will be pleased to provide you with appropriate and specific answers.

Sincerely,

SUBARU OF AMERICA

Paul Utans

Paul Utans
Vice President,
Governmental Affairs

PU:kls
cc: FHI
FUSA

Volkswagen of America, Inc.

COMMENT FOR THE RECORD

Volkswagen of America, Inc. (VWoA), with headquarters in Troy, Michigan, respectfully submits the following comment for the record concerning S. 1224, the Motor Vehicle Fuel Efficiency Act of 1989. VWoA is the importer and distributor of Volkswagen and Audi automobiles in the United States.

General

This comment addresses four subjects bearing on automobile fuel economy:

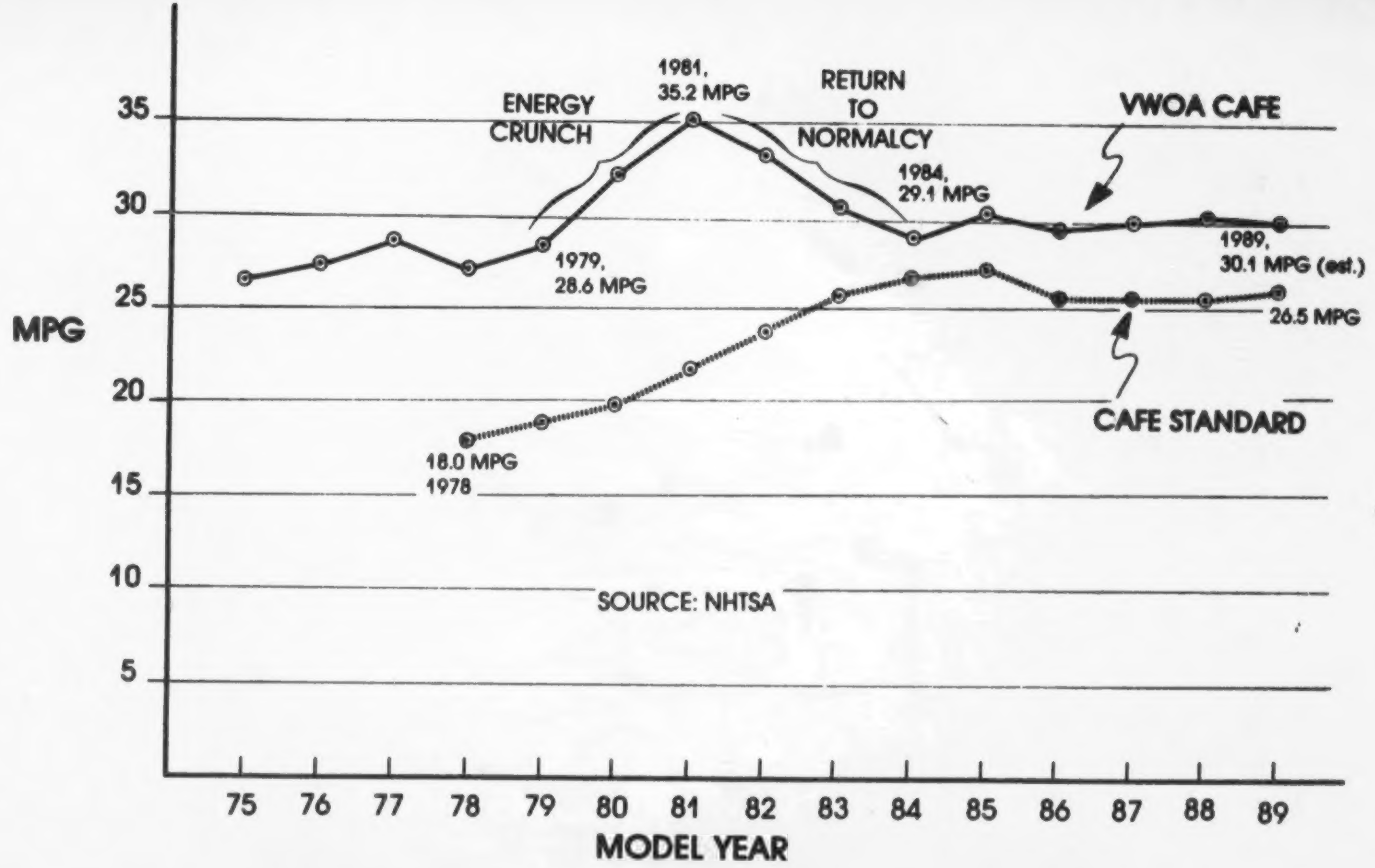
1) Fuel Economy Legislation and Regulation;
2) The S. 1224 Concept; and
3) Global Warming.

1. Fuel Economy Legislation and Regulation

Vehicles marketed by VWoA have been at the leading edge of fuel efficiency whenever the market has demanded automobiles that deliver high fuel mileage. Indeed, in the early 1980s, when fuel economy was the number one vehicle attribute desired by automobile shoppers, VWoA led the annual EPA fuel economy ranking year after year. However, since major fuel economy gains could only be made by making trade-offs in vehicle performance and comfort level, the hundreds of thousands of customers who purchased the high-mileage Volkswagens and Audis of that era were prepared to compromise on the vehicle attributes that are at the top of the list in normal times, when fuel is readily available and fuel prices are reasonable.

Figure 1 shows a plot of VWoA's fleet fuel economy from 1975 through 1989. The CAFE standards are also plotted for reference, but have no bearing on the market-driven fuel economy levels shown in the top plot. For model year 1979, just before the second fuel supply curtailment caused by the political revolution in Iran, the VWoA average fleet fuel economy was 28.6 miles per gallon.

In response to the demand for cars with greatly increased fuel economy, VWoA offered high-mileage, newly-developed, diesel-powered products for the 1980 and 1981 fuel-crisis model years, which were snapped up by eager buyers. These sales raised VWoA's CAFE level to 35.2 mpg for 1981 -- a 23.1 percent gain in two years. Had instability in the fuels market due to political in the Middle East continued, the VWoA CAFE level would have climbed even higher, purely as a result of the market situation



SOURCE: NHTSA

VWOA CAFE 1975 - 1989   Figure 1.

-- offering consumers the high mileage cars they wanted, at the expense of acceleration performance and comfort level.

In 1982, the fuel market began its return to normalcy, and, as Figure 1 depicts, the VWoA CAFE level dropped for the 1982 and 1983 model years. In this period, auto buyers readjusted the order of vehicle attributes on their shopping lists, and fuel economy moved far down from the top spot. The VWoA CAFE levels for model years 1984-1989 continued the trend of the 1975-1979 model years: slightly improving year-to-year, with no aberations as seen in the early 1980s.

With this background, it should be clear to all that the only regulation needed for fuel economy is the "regulation" induced by fuel price and availability in the marketplace: auto manufacturers will provide products that emphasize fuel economy at the expense of other vehicle attributes when the public demands it.

One element in the current fuel economy debate that has aroused interest is the assertion that the U.S. domestic manufacturers have made much greater strides in improving fuel economy than foreign companies. This contention is somewhat flawed, as shown in the table below:

CAFE Improvements 1975/1981

(Source: NHTSA)

MY	VWoA	GM	Ford
1981	35.2	23.8	24.1
1975	26.4	15.4	13.6
Diff.	8.8 mpg	8.4 mpg	10.5 mpg

The market drove each of these companies, VWoA, General Motors, and Ford, to make essentially the same gain from 1975 to 1981, even though VWoA started from an already high base in 1975 (26.4 mpg). VWoA's 8.8 mpg improvement lies between GM's 8.4 mpg and Ford's 10.5 mpg improvements. The car purchaser realized essentially the same gain: he or she could drive around 8 to 10 miles further on each gallon of fuel; the per-car fuel savings to the U.S. from the improvement by each of the three companies was about equal. The "percentage" improvement here is meaningless.

Do higher fuel prices really affect fleet average fuel economy? Although there are some who contend that in countries with fuel prices twice as high (or higher) than those in the U.S. the total CAFE level is not much different than here, this theory has never been fully tested. Taking the Federal Republic of Germany as an example, where the gasoline price is just about twice that of the U.S., the total passenger car fleet average fuel economy level in 1986 was 32.2 mpg. (The price of gasoline in the Federal Republic of Germany is higher only because of higher taxes; the raw fuel price is about the same as in the U.S.) In contrast, for model year 1986, the total passenger car CAFE level in the U.S. was 28.1 mpg. In our opinion, the 15 percent difference between nationwide CAFEs of 32.2 mpg for the Federal Republic of Germany and 28.1 mpg for the U.S. is significant as an indicator of the effect of fuel prices on CAFE. Furthermore, the Federal Republic of Germany fleet average fuel economy reflects fuel economy test driving cycles more typical of European driving characteristics than the EPA city and highway cycles, which biases the Federal Republic of Germany value even lower than what it would be if tested and calculated according to EPA regulations. (The Federal Republic of Germany fleet average fuel economy noted above includes a lengthy highway cruise cycle at 75 mph, which typically consumes 33 percent more fuel than the 55 mpg highway cruise cycle.) Suffice it to say that for 1986 the Federal Republic of Germany fleet average fuel economy was at least 15 percent (and more likely 20 percent under equal test conditions) above the U.S. total fleet CAFE, almost certainly due to the forces of higher fuel prices.

To conclude this section, it is our belief that market forces have played, and will continue to play, the major role in dictating the fleet average fuel economy. If it is to be the policy of the U.S. to raise the fleet fuel economy -- for whatever reason -- contrary to that imposed by the existing or forecasted fuels market, then legislation directed toward changing the fuels market (petroleum fee, rationing, etc.) is the logical choice. Legislation directed at manufacturers in this scenario is simply out of step with free market principles.

2. The S. 1224 Concept

The concept of manufacturer-specific "percentage increase" fuel economy standards embodied in S. 1224 is opposed by VWoA.

It is unnecessarily punitive for S. 1224 to mandate a 1995 CAFE of 36.6 mpg for VWoA while the CAFE set for Ford, for example, is 31.7 mpg. This discrimination against the company that made millions of Americans conscious of good fuel economy in the 1950s and 1960s while Detroit produced gas guzzlers is out of place in the U.S. legislative process, which has treated every manufacturer equally in the past. It is inappropriate to punish a company like VWoA that developed the small, light-weight, high-revving Diesel in the 1970s, bringing relief to hundreds of thousands of Americans anguishing over whether service stations would be open or not during a politically inspired energy crisis. The authors of the "percentage increase" concept should withdraw this attempt to manipulate the market, which would force Volkswagen of America into a market niche totally at odds with what consumers want, while the U.S. domestic manufacturers could take advantage of the market mainstream, protected by fuel economy legislation.

There is no room in the U.S. -- indeed, in the world -- for standards that are different for one company than for another. The "percentage increase" concept, if ever adopted, is destined to stand trial before the GATT. Retaliation by America's trading partners is a certainty.

Even from the technological standpoint, VWoA could not come close to a 36.6 mpg standard because the only viable technology, the Diesel engine, has already been effectively banned in California because of that state's stringent NOx and particulate standards, and is threatened with total extinction from the rest of the U.S. under proposed legislation to amend the Clean Air Act.

3. Global Warming

VWoA believes that enough information about global warming has been gathered, analyzed, and made available for the Congress to act wisely in addressing that subject.

We agree with the statements in the comment on S. 1224 submitted by the Automobile Importers of America, Inc. (AIA) regarding global warming as it relates to carbon dioxide contributions by cars and light trucks. Referring to a recent OTA report, AIA comments that with a new car fleet average of 32.5 mpg in 1994 and 33.3 mpg in 2000, the savings in fossil fuel emissions would be only 0.5 percent in 2010 in the U.S., and about 0.1 percent worldwide.

4. Closing

Even though fleet fuel economy improvements will have almost no measurable impact on the world's climate, should the Congress adopt legislation because of global warming threats, or because energy security is marginal, then that legislation should compel consumers to purchase fuel-efficient automobiles rather than force manufacturers to produce unsalable products.

VWoA appreciates the opportunity to submit this comment for the record.

Statement of Volvo Cars of North America on Fuel Efficiency Standards

Volvo is a limited line car manufacturer with sales in the U.S. of upscale, five passenger family vehicles that weigh between 3250 and 3750 pounds (EPA-equivalent test weights). Our market share is approximately 1%. The current CAFE requirements are geared towards full-line manufacturers with the inherent ability to balance production schedules of large vs. small vehicles in order to achieve CAFE, as well as manufacturers of smaller vehicles.

Volvo deeply believes that it has made reasonable efforts to improve its CAFE with the timely introduction of fuel-saving components and design features that are both proven and do not compromise Volvo's traditional design virtues of safety and reliability. For a list of fuel efficiency improvements introduced or utilized by Volvo through the 1990 model year, see Appendix I. As can be seen by the attached list, we have already introduced almost all of the fuel efficiency-related improvements envisioned by the Congress in 1975 which assumed $2.50/gallon gasoline in the mid-1980's. Since the lowering of crude oil prices with its corresponding effect on retail fuel prices (now unleaded gasoline U.S. price average is approximately $1.05/gallon), consumer priorities have placed fuel economy as a relatively low concern. For a comparison of retail gasoline prices world-wide, fourth quarter '88, see Appendix II.

It is also important to note that Volvo's concern and reputation for safety is of vital interest to us and to our customers. In fact, many Volvo safety innovations have been used as the basis for U.S. safety standards. As noted in previous papers on this subject, concern for safety has been one of the main reasons people have bought our cars for quite some time. Numerous studies have shown that vehicle size and weight are significant factors influencing occupant protection. We believe that simply to remove weight from our present vehicles could result in safety performance that would be of concern to Volvo buyers.

In fact, Volvo has developed many internal safety-related standards that go beyond what the federal government requires in many areas. The following list illustrates just a few of the features Volvo builds-in to help meet its own safety objectives:

- laminated rear windows (sedans)
- dual front seat belt retractors
- anti-submarining protection
- rear seat head restraints
- anti-lock brakes (ABS)
- independent rear suspension

Many of these features are not found on small cars. Many such manufacturers are able to take advantage of averaging these small cars with their larger, heavier models for fuel economy purposes. These safety improvements add weight to our cars, but we do not have a line of small cars to be able to average for fuel economy purposes. We will continue to search for ways to further improve the safety of our vehicles.

For the 1990MY in the U.S., all Volvos are equipped with a driver's-side air bag (SRS). Regarding FMVSS#208, it is important to point out that we considered using a passive belt system, which would have been lighter than the SRS but was rejected as not being consistent with Volvo's objectives.

Recently, the issue of global warming has gained world-wide attention. This is truly a world-wide condition. Of all the studies published concerning global warming, one conclusion is readily apparent. That is, not nearly enough is known about the science of global climate change for anyone to come up with concrete cause and effect data. Two things are surely required: further scientific study and unilateral actions, not just U.S.-based.

In a recent press release, Dr. Pehr G. Gyllenhammar, Chairman and CEO of the Volvo Group, called for the establishment of a European University for the Environment, to be known as CLENE, (Central Laboratory for the Environment, Northern Europe). It would consist of research scientists, students, guest researchers, and industry research personnel, all combined in an effort to develop practical solutions to environmental problems. This is just one of the many potential areas where global warming could be further explored.

World-wide activities on global warming could also stem from a U.N.-based conference, similar to the Montreal Protocol and its effect on future CFC production. A U.N.-based conference could look at the total world-wide issue of global warming, leading to world-wide solutions, if deemed necessary. We highly recommend this course of action.

Currently, two significant alternatives to the existing CAFE law have been proposed. We believe strongly that these new methods show great promise. One is a percentage increase based approach, where a manufacturer's CAFE must improve by a given percentage over a base model year's CAFE performance. This we believe is fair and equitable as every manufacturer would have to improve by the same percentage. Another approach is the OTA proposal of size class based standards. Vehicles would have to meet a CAFE standard based on their particular size class. We believe that both of these approaches are more equitable than the current CAFE law, and we favor the size class approach.

Conclusions

Volvo firmly believes the following:

1. Volvo, a limited line manufacturer, will continue to remain deeply committed to safety. It is at the center of our core values.

2. Effective solutions to the matter of global climate change must be developed on a world-wide basis, such as through a U.N.-sponsored protocol. International protocols on CFC's and NOx are proving to be an effective means to deal with world-wide conditions.

3. We believe alternative methods to the current CAFE law now being discussed (i.e. percentage increase, size class), are fair and equitable means for all manufacturers. Of these two, we favor the size class approach.

Appendix I

Fuel Efficiency Improvements - 1990 Model Year - Volvo

- A 100% installation of a 4-speed automatic transmission that includes overdrive gearing on all automatic-equipped variants.
- A 100% installation of a 5-speed manual transmission that includes overdrive gearing on all manual-equipped variants.
- A 100% installation of multipoint electronic fuel injection that includes electronic engine knock sensing.
- An aerodynamic optimization program to lower drag within the design of the existing body configurations, as well as the construction of a sophisticated wind tunnel in Gothenburg, Sweden.
- A tire installation program that bases selection of tires on low rolling resistance as well as meeting Volvo safety criteria.
- The availability of a turbo-charged four-cylinder engine as an alternative for consumers to our V-6 engine.
- The installation of a lock-up torque converter on certain of our models.
- Reduced friction engines.
- A weight-savings program where it is possible without compromising safety engineering.

WORLD-WIDE GASOLINE PRICES AND TAXES
FOR THE FOURTH QUARTER, 1988*

Country	Gasoline Prices (U.S.$/Gallon)	% of Tax in Gas Prices	Tax (U.S.$/Gallon)
Australia	1.59	49.4	.79
Austria	2.67	62.5	1.67
Belgium	2.55	64.7	1.65
Canada	1.52	40.5	.62
Denmark	3.67	75.3	2.76
Finland	3.03	52.0	1.58
France	3.04	76.9	2.34
Germany	2.19	64.0	1.40
Greece	1.99	66.4	1.32
Ireland	3.31	70.7	2.34
Italy	3.90	78.3	3.05
Japan	3.48	47.0	1.64
Luxembourg	2.22	56.4	1.25
Netherlands	3.01	70.4	2.12
New Zealand	2.11	51.0	1.08
Norway	3.10	66.6	2.06
Portugal	3.07	66.0	2.03
Spain	2.41	65.2	1.57
Sweden	2.81	62.2	1.75
Switzerland	2.43	64.7	1.57
United Kingdom	2.53	67.8	1.72
United States	.95	31.5	.30

* All U.S. Dollar amounts are rounded to the nearest cent.

Source of Data
Energy Prices and Taxes, Fourth Quarter 1988.
International Energy Agency, OECD, pp. 264, 273.

A subsidiary of BMW AG

BMW of North America, Inc.

September 18, 1989

The Honorable Richard H. Bryan
Chairman of the Consumer Subcommittee
Committee on Commerce, Science and Transportation
U.S. Senate
Room SH-227
Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Bryan,

The following represents BMW of North America, Inc. comments on S. 1224, Motor Vehicle Fuel Efficiency Act of 1989, which was subject to a hearing before the Senate Commerce Committee on September 7, 1989. BMW has its principal place of business in Woodcliff Lake, New Jersey and is the sole factory-authorized importer of BMW automobiles and motorcycles into the United States.

We serve only a small segment of this country's market, however, the products we offer to our discerning customers are considered to be on the leading edge of technology, setting many standards followed by the rest of the industry. We feel, therefore, that we do have the technical competence to speak about the feasibility to increase fuel efficiency of today's automotive fleet, as proposed under this bill.

This bill has the avowed purpose of reducing U.S. oil consumption and addresses the global warming due to increase of atmospheric carbon dioxide (CO2). With the information that has become available today, these are obviously commendable goals. But it is BMW's belief that raising the CAFE standard and increasing its penalties would not move the country toward energy independence or reduce CO2 emissions; rather it would severely disrupt the motor vehicle communities of both the U.S. and Europe.

It wasn't until 1987 that the U.S. BMW fleet was assessed a fuel economy penalty. As a matter of fact, BMW's fleet exceeded the fuel economy standard, sometimes by more than 5 mpg, since CAFE was instituted. Because we started from an already high base fleet average, it was more difficult for BMW to improve fuel economy, but nevertheless, in the ten years from 1974 - 1984, BMW improved its actual fleet average by 64%.

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This was achieved at a time when Congress not only implemented CAFE regulations, but also when scarce fuel supply and high fuel prices created a demand for fuel efficient vehicles.

BMW achieved the improved fuel economy by a weight reduction program, improved vehicle aerodynamic design, reduced engine displacement, introduction of a diesel engine and a low-friction-high-torque ETA gasoline engine, high-tech electronic engine controls, state of the art emission control, fuel saving transmissions, and even instantaneous and averaging fuel economy gauges that focus driver attention on fuel consumption.

But stringent diesel emission standards were introduced, the price of diesel fuel escalated compared to gasoline, and the public perceived diesel engines as having poor value and reliability, forcing, not only BMW, but all manufacturers to remove the most fuel-efficient automobiles from the U.S. market.

At the same time, BMW's annual consumer surveys into owner satisfaction and ranking of desired features showed that fuel economy declined in importance as a factor in deciding to purchase a BMW. By 1985 fuel efficiency was not even mentioned anymore by our customers as a desirable attribute. Acceleration, power, and performance, however, increased in importance during the same period. For all BMW models, this attribute has become more important to our owners than fuel economy. Our higher performance models offered much greater satisfaction levels to their owners and showed a greater owner loyalty rate when purchasing a new vehicle than the owners of our more fuel-efficient models.

Nevertheless, the technical changes made to achieve the best possible fuel economy, helped BMW to 'hold the line' on fuel efficiency up to 1985, but the surge in demand for better performing vehicles severely limited BMW's ability to progress further in its fleet average and eventually we had to make product adjustments to meet customers' demand.

In addition, during the '80s, BMW voluntarily included many advanced safety features which added weight and made compliance with CAFE even more difficult. For instance, to name a few, our bumper impact speed considerably exceeds the minimum impact requirements, in 1985 we introduced airbag systems before passive restraint requirements became effective, and we installed antilock braking systems as standard equipment in all of our models since 1986.

Without high-priced fuel or a fuel shortage, manufacturers are forced by the marketplace to produce and sell the type automobile the consumer wants for characteristics other than fuel economy. This represented a distinct shift in the market, biasing production toward reduced fuel efficiency and making it impossible to comply with CAFE.

If technology were the only factor to be considered in raising fleet fuel economy, BMW could comply with a higher CAFE as well as any other manufacturer. We currently sell automobiles in other countries that would provide higher fuel economy than those we import into the U.S. If we could sell them in this country, we would be happy to import these vehicles for purposes of fulfilling CAFE requirements. But these automobiles are totally unsuitable for the United States of today - their comparative lack of performance for the niche BMW occupies in this country's market would now make them completely unsalable.

This also was recognized by the NHTSA in the Federal Register of October 6, 1986, at 51FR35605, "As gasoline prices decrease, the costs of operating larger cars and of greater performance, decrease. Thus, all other things being equal, consumer demand for larger cars and greater performance increases."

It is not CAFE, therefore, that controls the market for fuel efficient vehicles, but rather the price and availability of fuel. When fuel was at a premium, BMW exceeded the CAFE requirements and if the oil markets are again disrupted, BMW will again be able to respond appropriately. But with the real price of fuel running at today's very low levels, any higher CAFE standard would be overkill in our marketplace.

Further support for the impact the marketplace has on the demand for fuel efficiency is supplied by the actual fuel economy results in the late 70's and early 80's. The fleets of Asian manufacturers, composed mainly of small cars, had average fuel economies high enough that they would only have had to make small adjustments in 1984 to comply with CAFE, but consumer demand for fuel economy, fed by fuel shortages and escalating gasoline price, caused their average fleet fuel economies to increase sharply as early as 1979.

The same is true for domestic and European manufacturers, who would have had to make drastic improvements for 1983; they did so in 1980, also responding to the marketplace rather than the later-effective CAFE standard.

The flexibility built into the CAFE concept makes fuel efficiency a marketing factor that manufacturers must consider when designing for salability in a free marketplace. The requirement of salability forces manufacturers to balance the need to meet both CAFE and customer demand for fuel-efficient cars, against performance and other desirable-but-conflicting characteristics.

With choice, consumers can postpone purchase of automobiles, buy used cars, purchase light trucks or vans, or switch to larger cars. A higher CAFE would cause the consumer to take these actions because of the undesirable characteristics of high efficiency automobiles, and thus be counterproductive. Fuel efficiency would suffer, emission reduction would slow down, mileage reduction would not be encouraged.

It must also be recognized that, in raising CAFE, each additional tenth of a mile per gallon improvement saves the country less and less additional oil because of the law of diminishing returns. These 'top end' improvements are also the most difficult to achieve because the most cost-effective, and technological feasible changes were already implemented by the manufacturers when they doubled the fleet's fuel economy. Unfortunately, noncompliance with each tenth of a mile per gallon requirement bears the same penalty, i.e. $5/.1 mpg/automobile, regardless of the fuel saved or the difficulty of achievement.

While the CAFE concept was instituted to allow full line manufacturers compliance flexibility by modifying either marketing or manufacturing, we notice that now even the multi-line domestic manufacturers state that CAFE does them an injustice because they can not increase production of the larger cars and the performance cars the public demands. BMW is burdened even more because of its limited line of automobiles.

The average European car maker selling automobiles in the U.S. is a limited-line manufacturer unable to take advantage of the averaging technique inherently built into CAFE. Driven by the low-cost-fuel market and unable to average large models against small models, the European manufacturer is hard-pressed to meet the current CAFE. While Asian manufacturers import their fleets of small, low-cost vehicles, their area of expertise around the world, the European fleets are narrowly focused on performance-quality-safety-high technology, their niche. Thus, while raising the CAFE standard could directly benefit Asian importers, this advantage would be at the expense of domestic and European makers.

The purpose of CAFE was to reduce oil consumption in order to increase the country's security, reduce the U.S. trade gap, and conserve dwindling energy supply. The data show that annual oil consumption was not reduced - to the contrary - if all factors bearing on oil consumption are graphed, it can be seen that components controlled by an improving economy, such as increasing total vehicle miles traveled, increasing individual average miles traveled, increasing light truck and van substitution for passenger cars, and increasing vehicle registrations were just too great to be compensated by the improving fuel economy of the fleet. If anything, the improved fuel economy induced more driving. The CAFE standard left the owner out of the equation, so that as soon as fuel price moderated and fuel was again generally available, there was no incentive for the user to conserve gasoline by usage, or to further purchase fuel efficient vehicles.

Total fuel consumption fell precipitously until 1982, when it reversed its decline and dramatically increased. If the total annual fuel consumption and the price of fuel were graphed over time, the inverse proportion would be obvious, the two graph lines almost forming mirror images of each other. The graph's time relationship would show fuel price escalating, peaking and falling, followed about one year later by fuel consumption falling, bottoming, and then rising again, strongly indicating that the price of fuel and not CAFE is what determined fleet fuel economy.

Now, a new and extremely important factor has entered the field - the realization that the rate of CO2 production may contribute to global warming. But unlike other emissions, CO2 cannot be reduced by installing scrubbers in smokestacks or catalytic converters on engines; only efficient use of fossil fuel and substitutes of non-fossil fuel will help.

The transportation industry, at great cost, has done more to save oil than any other industry. Yet motor vehicles contribute less than 15% of the U.S. man-made CO2 emissions. While a tax at the pump would be efficient in immediately reducing gasoline consumption, like CAFE, it would still place an unequal burden on a single element, the automotive community, in a society that has many sources of CO2 generation and many different users of fossil fuel.

We therefore believe that the fastest and the only equitable route to fossil fuel conservation and reduced CO2 production is a carbon fee - a fee at the source of production, in proportion to each fuel's CO2 generation for a given measure of energy released.

Additional improvements in fuel economy would still come about because of the higher price for carbon fuel, but the rest of society would then make its even greater contribution by more efficiently utilizing all fossil fuel and by substituting other sources of energy. Greater savings would be realized than from a gas tax, and the cost would be spread over a much larger base, reducing the per capita cost. A carbon fee would raise gasoline cost, but keep its price in proportion to the contribution of each industry.

Equally important is that the whole economic/ecological structure of any fuel economy mandates must be considered. Simply building smaller cars or small and low-powered fuel-efficient engines is not a solution if consumers resist their purchase. Reducing the average weight of the current new car vehicle fleet further in order to achieve fuel savings would require the use of an even higher degree of light weight materials than already in production today.

These light weight materials are either energy intensive and/or environmentally more difficult to process than traditional sheet-metal stamping or iron casting. Aluminum, for example, is not only expensive but energy-inefficient as a manufacturing material, and again if recycled. The increased use of plastics is presenting a growing disposal problem and should not be forced on the automobile industry unless the infrastructure for recycling these materials is equally assured.

To achieve the goal of manufacturers to produce and purchasers to buy ecologically benign and sustainable products could best be served through proper market incentives, such as a carbon fee. It seems to us that this would be the most effective way to address the environmental issues of today.

The last ten years clearly have shown that concentrating on CAFE will not bring the desired results in absence of needed market incentives.

Sincerely,

Karl H. Gerlinger
President

cc: All Commerce Committee Members

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Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT
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JOHN H. GIBBONS
DIRECTOR

September 20, 1989

To: John H. Gibbons, Director

From: Steven Plotkin, Senior Associate

Subject: RESPONSE TO SENATOR BRYAN'S REQUEST FOR INFORMATION CONCERNING S.1224

I have responded to Senator Bryan's request to provide the Consumer Subcommittee with information on S.1224, the Motor Vehicle Fuel Efficiency Act of 1989. Part A is a review of the proposed bill, based in large part on an earlier review I provided to Subcommittee staff. Part B answers several of the questions he posed in his letter of September 6, 1989. I have not attempted to answer all of the questions in full: some are more appropriately answered by other Agencies, and some concern subjects that we have not addressed recently.

A. COMMENTS ON S.1224

1. In Section 2, several of the Findings could benefit from clarification or alteration:

a. In (9), it is the new passenger car fleet that has doubled in efficiency. With its current language, we expect that many readers might interpret this finding as implying that the entire fleet has doubled in efficiency.

b. In (11), we believe that it is unlikely that the new car fleet could achieve 38 mpg by 1995 using conventional technology, without changes to size mix or performance. In both DOE's and EPA's analysis, the 38 mpg figure represents a theoretical "accelerated technology" case that would have involved a major disruption to the industry's product development schedules had it been adopted as a standard about a year ago. *It is now difficult and perhaps impossible to achieve because of time limitations.* The 33 mpg lower bound represents the fuel economy that is "cost effective" in the sense that consumers would save enough in gasoline (assuming gasoline prices at $1.10/gallon) over 4 years of ownership to recoup the higher purchase price of the vehicles (of course, increased gasoline prices would shorten payback periods, and reductions would lengthen them). The 33 mpg figure, however, assumes that the level of power and luxury of the fleet does not change from 1987, the analysis base year. The fleet *has* changed since 1987, growing somewhat larger and more powerful, so that achieving 33 mpg probably doesn't represent a "cost effective with a 4 year return" case anymore. However, achievement of 33 mpg by 1995 probably remains cost effective within a vehicle lifetime of 10 years. We believe that the finding would be more realistic if it simply stated that 33 mpg was possible by 1995.

c. In (12), the language gives the impression that technology currently in production can play an important role in increasing fleet fuel economy well beyond the 38 mpg cited in (11). In the DOE and OTA analyses, the 38 mpg value represents a case that moves most available technology throughout the fleet. Whatever the timetable, the industry clearly cannot squeeze much more out of technology currently in production. To achieve a 40-60 mpg fleet is going to take new technology, and lots of it, if the fleet's present size mix, acceleration and other performance characteristics, and safety have to be maintained. Also, achieving these levels of fuel economy will require a major reining in of current market trends towards more luxury and better performance.

We would also like to comment on the finding that technology "in prototype" will allow the fleet to achieve between 40 and 60 mpg. There are, indeed, prototype vehicles that achieve very high fuel economy, some close to 100 mpg. Essentially none of these vehicles matches average vehicles in the current fleet with respect to size, performance, and standard amenities such as air conditioning and other power accessories. Most of the prototype vehicles have not passed U.S. emissions and safety requirements. Further, successful operation of such prototypes, though encouraging, does not prove that the technologies on the vehicles would prove successful in customer service.

We believe that there are real opportunities for the U.S. passenger fleet to attain much improved fuel economy, and are concerned that sufficient incentives do not exist to push the development and commercialization of new technologies. However, the finding makes it seem that the needed technologies are available, so that all that is necessary is to force automakers to install them. We disagree.

2. In Section 514 (for automobiles) and 515 (for light trucks), the Bill requires each manufacturer to achieve a percentage increase in their 1988 CAFE of 20 percent by 1995 and 40 percent by 2000. We have some concerns about the effects of a regulation structured this way, and we'd like to share them here.

There are three basic reasons why different companies have substantially different fleet fuel efficiencies:

1. They sell a different mix of car sizes, with some focusing on the "small car" segment of the market, others on large cars, still others on providing a range of sizes;
2. They aim at different segments of each market, that is, recreational, commuting, family, luxury, etc., and thus have vehicles with very different performance characteristics and energy-consuming luxury equipment; and
3. They have made conscious decisions to pursue new, energy-efficient technology at different rates.

The current CAFE structure treats each manufacturer the same. Thus, a company manufacturing only small cars (e.g., Hyundai) must meet the same standard as one manufacturing a wider range of sizes (e.g., General Motors). The flaw in the current structure is that, if it is set at a level that is at all realistic for GM, it is not going to put any pressure on companies making smaller cars. These companies therefore are less likely to improve the technology of their fleets, and also have more freedom to focus their marketing strategies on high performance features...which puts pressure on the full line manufacturers to compete with higher performance on their own car lines. Current market trends towards higher power and more luxury features seem to reflect these pressures.

The formula in the proposed Bill seeks to recognize this situation by requiring each company to improve its current CAFE by the same percentage...so that companies who have achieved a high current CAFE by focusing on small cars cannot just rest on their laurels but must press on. The importance of putting strong pressure on *all* manufacturers, so as to rein in market pressures towards ever-increasing horsepower and other efficiency-robbing features, is critical to achieving a higher overall CAFE without seriously distorting the market. Thus, this proposal seems to be a definite improvement over the alternative of simply raising the industry-wide standard.

We do, however, have two important concerns about the structure proposed in S.1224:

First, the proposed structure may be vulnerable to claims that it is inequitable and unfair. The structure does not account for the fact that at least a portion of the current differences in companies' CAFEs are due to reason 3 above -- the companies' different efforts at moving advanced technology into their fleets. Our analysis of the fuel economy characteristics of various company fleets, which we presented in our testimony to the Subcommittee on May 2, 1989, indicates that some companies have fleet fuel economies that are well above the industry average even when the effects of fleet size distribution are accounted for. Thus, this type of standard penalizes manufacturers who have tried the hardest to increase their fleet fuel efficiency in the past. They now have the most difficult technological challenge, because they have already "used up" a larger portion of the technological headroom available to them from off-the-shelf technology. Companies that have hesitated to use the best available technologies -- the companies we would like to motivate the most -- are instead rewarded by being presented with the lowest efficiency target. Furthermore, there is the possibility that consumers may not place a high value on the increased levels of fuel efficiency, and thus may tend to prefer lower efficiency vehicles from the "favored" companies, because their price tags don't include the costs of the most advanced technologies. Also, it is possible that companies that wind up with the lowest efficiency targets could use the leeway these lower targets afford them to increase vehicle performance to levels that companies with higher efficiency targets may not be able to match (because higher performance reduces fuel efficiency). If either of the latter two outcomes occur, we have not only rewarded the lower efficiency automakers with an easier target, but have given them a market advantage as well.

Second, the structure may lessen consumer choice. The structure ignores the possibility that companies may wish to change the size makeup of their fleets, and will make it far more difficult for them to do so. Because their fuel economy targets are based on the 1988 makeup of their fleets, automakers who now focus on small cars will have great difficulty in changing their mix towards larger cars. This would lessen competition in an important segment of the market. Perhaps this would be beneficial if it tended to move consumers towards smaller vehicles (although some analysts will claim that the safety implications of such a move are strongly negative); however, it is more likely that consumers will continue to buy the size vehicle they want, but they'll have fewer choices.

3. Another concern, about Section 515, is that the percentage increases fail to recognize the problem caused by the wide range of vehicles covered by the designation "light trucks" and the rapidity with which the light truck market is changing. A number of companies are in the process of introducing new vans that are significantly different from their old versions, and the result could be a radical shift in market shares. Also, the light truck market has grown so fast that market shares and fleet mixes of different truck types in any one year mean little. In this type of market, basing a standard on one year (1988) with no attempt to account for the different vehicle types represented in the fleet is an invitation to severe market distortion.

4. A final concern is about the size of the percentage increase required by Section 514. With a total fleet fuel economy of 28.3 mpg in 1988, a 20 percent increase for each manufacturer would require a 1995 fleet fuel economy of about 34 mpg. We note that this value is well above OTA's cost-effective 1995 case of 33 mpg, which is itself optimistic because it is based on 1987 fleet performance and size characteristics.

B. RESPONSE TO SENATOR BRYAN'S QUESTIONS (LETTER OF SEPTEMBER 6, 1989)

We have not attempted to respond fully to all of the Senator's questions, because our work has not included all of the subjects he has covered.

1. Trends in the need for imported oil.

For the first quarter of 1989, the United States imported a net of 6.95 million barrels per day (mmbd) of crude oil and petroleum products, and consumed 17.61 mmbd, for imports of 39.5 percent. A year earlier, first quarter imports were 35.6 percent. This trend of rising imports became established in 1986 when oil prices plummeted, and there is every indication that it will continue. The Energy Information Administration's latest "base case" forecast projects import levels to rise to 52 percent by 1995 and 55 percent by 2000. This trend represents the combined effect of steadily dropping domestic oil production and rising oil consumption.[1] Previous studies by OTA (for example, U.S. Oil Production: The Effect of Low Oil

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[1] Projections from Energy Information Administration, Annual Energy Outlook, 1989, DOE/EIA-0383(89), January 1989; data from Energy Information Administration, Short-Term Energy Outlook, 3rd Quarter 1989, DOE/EIA-0202(89/3Q), July 1989.

Prices, and several on energy efficiency) indicate that some potential exists for slowing this trend, but we basically agree that oil imports will continue to rise over the next decade.

Another aspect of importance is the dependence of the United States on less secure sources of oil. At present, such dependence is not great. For the first half of 1989, for example, the majority of U.S. petroleum imports came from what could be termed "secure" suppliers. A total of 57 percent of imports came from Mexico, Canada, Venezuela, Norway, and the United Kingdom. Nigeria and Indonesia supplied another 18.8 percent. Of the largest Middle East suppliers, Saudi Arabia supplied only 2 percent, Iraq only 1.5 percent of U.S. imports.[2]

2. U.S. gasoline use and carbon dioxide emissions.

In 1985, the United States consumed 66.23 quadrillion Btu's (quads) of fossil energy,[3] which in turn emitted about 10 trillion pounds of CO2.[4] The transportation sector played a major role in this energy consumption and CO2 emissions:

TOTAL TRANSPORTATION	
- energy consumed	20.12 quads[5]
- percent of U.S. fossil energy consumption	30.4 percent
- percent of U.S. fossil CO2 emissions	27.5 percent[6]
- implied CO2 emissions	2.75 trill. lbs.
AUTOS	
- energy consumed	9.07 quads[7]
- percent of U.S. fossil energy consumption	13.7 percent
- volume of gasoline and diesel fuel	72.6 bill. gallons[8]
- emissions of CO2	1.45 trill. lbs.[9]

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[2] Data from Energy Information Administration, Petroleum Supply Monthly, June 1986, DOE/EIA-0109(89/06), August 1989.

[3] Energy Information Administration, Annual Energy Review 1987, DOE/EIA-0384(87), May 1988.

[4] U.S. Environmental Protection Agency, Policy Options for Stabilizing Global Climate, draft report to Congress, Washington, D.C., February 1989.

[5] EIA, Annual Energy Review, op cit.

[6] EPA Policy Options report, op cit, early draft

[7] S.C. Davis, et al, Oak Ridge National Laboratory, 1988 Automated Transportation Energy Data Book, Draft, May 1988, Table 1.10.

[8] At 125,000 Btu/gallon higher heating value, predominantly gasoline.

[9] 20 pounds/gallon of gasoline, from: MacDonald, Gordon J., Statement before the Senate Committee on Environment and Public Works, Subcommittee on Hazardous Wastes and Toxic Substances, and Subcommittee on Environmental Protection, Hearing on the Greenhouse Effect, Climate Change, and Ozone Depletion, January 28, 1987, assuming 125,000 Btu per gallon of gasoline.

- percent of U.S. fossil CO2 emissions	14.4 percent
LIGHT DUTY FLEET (autos plus light trucks)	
- energy consumed	11.75 quads[10]
- percent of U.S. fossil energy consumption	17.7 percent
- volume of gasoline and diesel fuel	94.0 bill. gallons[11]
- emissions of CO21.88 trill. lbs.	
- percent of U.S. fossil CO2 emissions	18.6 percent
TOTAL GASOLINE	
- energy embodied in the fuel	13.09 quads
- percent of U.S. fossil energy consumption	19.8 percent
- volume of fuel104.7 bill. gallons	
- emissions of CO2	2.09 trill. lbs.
- percent of U.S. fossil CO2 emissions	20.7 percent

3. Expected levels of passenger fleet fuel economy, for both new vehicles and total fleet, 1995 and 2001.

In the absence of new federal fuel economy regulations, fuel economy levels of future fleets of new vehicles will depend upon a number of difficult-to-predict factors, including:

- industry determination to improve fuel economy, possibly as a means to deter further regulation;
- current and expected future gasoline prices and availability;
- consumer demand for features that conflict with fuel economy, including larger size vehicles, higher performance, more luxury features, traditional styling and weight, and features such as four-wheel drive;
- new federal safety and emission requirements
- levels of traffic congestion;
- demand for light trucks (which will affect total *light duty fleet* fuel economy;
- the technical and market success of new efficiency technologies; and
- consumer concerns about global warming and the resulting influence on purchasing decisions.

Although fuel economy in 1995 will be heavily influenced by existing industry plans, year 2001 fuel economy should be largely free of such influence, and thus especially difficult to predict.

OTA's "best guess" for new car fleet fuel economy in 1995 and 2001 is 29-30 mpg and 31-33 mpg (EPA values), respectively. These values are based on an assumption of relatively stable gasoline prices over the next decade, and a general continuation of recent market trends in consumer preferences for vehicle performance, size, and other attributes. If market trends or gasoline prices change significantly, obviously the projections will change, especially for the later years. The year 2001 estimate is *not* based on quantitative analysis and should be interpreted accordingly. Assuming the current 15 percent difference (see our answer to question 11) between EPA and estimated in-use fuel economy will still hold in the future -- a heroic assumption -- the in-use values are about 25 mpg for the 1995 new car fleet and about 26-28 mpg for the 2001 fleet. If urban congestion increases significantly, however, these values will be too optimistic.

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[10] S.C. Davis, op. cit.

[11] At 125,000 Btu/gallon higher heating value, predominantly gasoline.

If these fuel economy values for the new car fleet are correct, the corresponding values for the *total* fleet of cars in service are: 27.4 mpg (EPA) and 23.3 mpg (in-use) for 1995; 29.6 mpg (EPA) and 25.1 mpg (in-use) for 2001.

OTA has done minimal work on light truck fuel economy, and we would prefer to leave estimates of their future fuel economy to those who have more thoroughly studied these vehicles.

4. ***Expected trends in vehicle miles traveled.***

OTA has addressed the question of "vehicle miles traveled" (VMT) in its previous testimony to the Subcommittee, and the relevant portions of that testimony are appended here for your convenience. In general, we agree that light duty VMT will likely rise over the next decade at a rate between 2 and 3 percent per year, which is slightly below the rate of the past few decades.

5. ***Vehicle fuel economy necessary to offset increased fuel consumption and carbon dioxide emissions associated with rising VMT.***

Most projections for gasoline use show year 2000 use ***below*** current use. The expected drop in gasoline usage occurs because the efficiency of the total fleet will continue to improve fairly rapidly because of vehicle turnover, despite a slowdown in efficiency improvements in the *new* vehicle fleet.

The EIA Annual Energy Outlook Base Case shows total gasoline use in 2000 at 7.26 mmbd compared to 1989 use of 7.44 mmbd. However, use is rising in 2000 as steadily increasing VMT begins to outweigh increasing fuel economy. OTA's projections for gasoline use by automobiles shows a similar trend: assuming the projected values for new car fleet efficiency in (3) above, we estimate the year 2000 gasoline use by automobiles to be 69 billion gallons versus 73.6 billion gallons in 1989.[12] As with the EIA projection, gasoline use is rising in 2000. The reason that auto fuel use falls more than total gasoline use is that light truck mileage is growing faster than auto mileage, so that rising light truck gasoline use offsets some of the decline in automobile gasoline use.

Consequently, no further increases in new car fuel efficiency ***above expected values*** are necessary to prevent year 2000 fuel consumption and carbon dioxide emissions from rising from today's levels -- they are likely to be lower even without such increases. However, both fuel use and carbon dioxide emissions are likely to rise significantly above today's levels in the years *beyond* 2000 unless fuel economy grows faster than expected levels.

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[12] source: exercise of the Alternative Motor Fuel Use Model developed at Oak Ridge National Laboratory.

Because fuel use beyond 2000 depends particularly on the growth of travel demand in this time frame, and this growth is unpredictable, it is difficult to estimate how much fuel economy must improve to prevent fuel use and CO2 emissions from growing. However, if travel demand were to continue to grow at a rate of slightly over 2 percent/year, fuel economy would have to improve at a similar rate to offset this growth. In earlier examinations of some fuel economy scenarios, OTA showed that an improvement in automobile CAFE to 32.5 mpg by 1995 and a leveling off to about 33.5 soon after 2000 would still have auto fuel demand starting to rise by about 2000 and topping 1989 levels soon after 2010. On the other hand, a continue rise to 36 mpg by 2000 and 42 mpg by 2010 would cause auto fuel demand to drop steadily through the remainder of this century and at least 10 years beyond, reaching about 63 billion gallons/yr by 2010 (versus 74 billion gallons in 1989) despite a large increase in VMT.[13]

6. and 7. Achievable levels of fuel economy, 1995 and 2000.

The years and assumptions specified in the question clearly refer to the conditions assumed in a recent analysis conducted for the Department of Energy by Energy and Environmental Analysis, Inc. OTA has seen the results of this study, but would prefer that they be presented and explained by DOE. The methodology of this study is identical to the one used in OTA's earlier analysis of fuel economy for 1995, which was presented to the Subcommittee in our May 2 testimony. We believe the DOE analysis to be sound.

8. and 9. Relationship between CAFE standards and emissions.

OTA addressed the relationship between increased fuel efficiency and emissions in its July 12, 1989 testimony to the Energy and Power Subcommittee of the Energy and Commerce Committee, and we have appended the relevant portions of that testimony. As discussed in that testimony, there *is* a relationship between fuel economy and emissions, but it is mixed up in a more complex relationship between these attributes and others such as performance, driveability, vehicle maintenance, and so forth. Theoretically, a stringent CAFE standard and stringent emission standard could interfere with each other. However, the emission standards proposed by the Bush Administration should be readily achievable with technology that should not greatly affect fuel economy. Were the standards to be more stringent, there could be a significant effect on fuel economy, but the magnitude of the effect would depend on manufacturer decisions in selecting emission control systems. Up to a point, effects on fuel economy could be held to a low level if the manufacturers would be willing to incur higher costs or perhaps slightly reduced performance. We believe this to be the case for the California emissions standards.

10. Effect of Increased CAFE standards on vehicle safety.

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[13] Testimony of S.E. Plotkin before the Subcommittee on Energy and Power, Committee on Energy and Commerce, July 12, 1989.

OTA dealt with the issue of automobile safety in some detail in its 1982 study on Increased Automotive Fuel Efficiency and Synthetic Fuels, but we have not reexamined this issue in the intervening years. Therefore, we would like to leave a detailed answer to this question to the Department of Transportation and NHTSA. We do, however, have some comments to make on this subject.

First, smaller, lighter automobiles are inherently less safe than similarly-designed larger, heavier automobiles, simply because of the laws of physics. And although it certainly is true that some small cars, e.g. the Chevrolet Nova, do quite well in government-sponsored crash tests, accident statistics favor large cars -- the lowest injury and fatality rates almost always go to large station wagons and large luxury sedans. These statistics are affected by factors other than the pure crashworthiness and crash avoidance characteristics of the vehicles -- particularly by differences in the ages of the drivers -- but they are nevertheless quite convincing. To the extent that any CAFE legislation leads to significant downsizing of the fleet -- either or both a shift to smaller size classes and designs that maintain interior volume but reduce length and weight -- safety will be reduced, all other things remaining equal.

Second, a long history of analysis of accident statistics, crash testing, and research into safety systems and prototype safety vehicles demonstrates that vehicle design is extremely important in vehicle crashworthiness and crash avoidance. A great deal of safety equipment has already been added to today's vehicles, and their basic body structural designs reflect considerable experience with crash analysis. Considerable "headroom" for further safety improvements still exists, however, although some of this headroom must be bought at not-inconsequential cost. It seems clear that, were a significant downsizing of the fleet to occur, a good portion of any loss in safety could be avoided by improvements in safety design.

Third, although we are basically optimistic that changes in design can compensate for considerable downsizing, we must also note that some safety equipment adds weight to vehicles, and those setting CAFE standards should recognize that future government requirements for equipment such as anti-lock brakes and air bags will reduce somewhat the potential for efficiency improvements.

Fourth, to repeat a very reliable cliche, necessity is the mother of invention. Although Americans do not rate safety very high on their list of the vehicle attributes they are looking for in a new car, this may be because most Americans are not unhappy with what they perceive to be the state of U.S. vehicle safety. If this perception changes or threatens to change -- as it might if cars get smaller -- manufacturers are going to want to combat this change, and we predict that they will do so by strengthening their safety system designs and loudly telling their customers that they have done so.

11. Relationship between EPA test fuel economy and actual on-road economy.

OTA has not specifically studied the relationship between EPA test fuel economy levels and actual on-road fuel economy, so we cannot answer this question with any authority. We understand that analysts typically reduce EPA values by 15 percent to calculate on-road fuel economy. A recent DOE contract analysis has estimated that, by the year 2010, the combination of increased congestion in existing urban areas, expansion of urban areas, and increased highway speeds may decrease on-road fuel economy by as much as another 15 percent from the EPA values.[14]

12.OTA reports on fuel economy and CAFE.

OTA has produced only one report on fuel economy since 1980: Increased Automobile Fuel Efficiency and Synthetic Fuels: Alternatives for Reducing Oil Imports, September 1982. We have in progress a report on increased fuel economy in the light duty fleet, with expected publication a few months away. This report will incorporate some examination of CAFE regulations. In addition, we have testified three times on this subject within the past few months (before the Oversight and Investigations Subcommittee, House Energy and Commerce Committee; Consumer Subcommittee, Senate Committee on Commerce, Science, and Transportation; and Energy and Power Subcommittee, House Energy and Commerce Committee).

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[14] F. Westbrook and P. Patterson, "Changing Driving Patterns and Their Effect on Fuel Economy," SAE Government/Industry Meeting, Washingtion, D.C., May 1989.

ATTACHMENT TO OTA RESPONSE TO QUESTION 4
From: "Increasing the Efficiency of Automobiles and Light Trucks -- A Component of a Strategy to Combat Global Warming and Growing U.S. Oil Dependence," Testimony of S.E. Plotkin, Office of Technology Assessment, to the Consumer Subcommittee, Committee on Commerce, Science, and Transportation, U.S. Senate, May 2, 1989.

TRAVEL DEMAND

The likelihood that the market will act to slow down improvements in fleet efficiency is particularly worrisome to energy policy analysts because the complementary component of oil use -- the vehicle miles traveled (VMT) -- is expected to continue to rise. The rate of increase in light duty passenger vehicle miles traveled between 1970 and 1987 was very large -- about 3 percent per year. For the remainder of the century, the rate of increase is likely to be smaller for demographic reasons, but there is considerable uncertainty, and quite conceivably the rate of increase could remain high.

As shown in Figure 9, the rise in VMT over the past several decades has been almost constant, as expected "saturation points" in auto ownership and travel demand did not occur. Initial assumptions that vehicle

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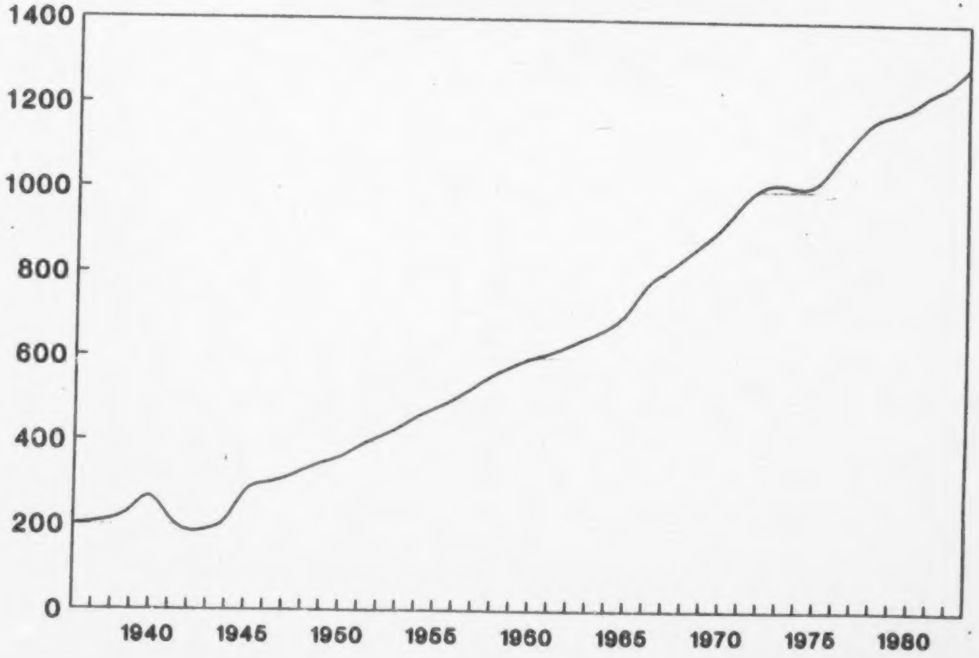
25. Assuming that light trucks account for about one third of the new light duty fleet.

FIGURE 9.

U.S. Auto Fleet Travel
(vehicle miles travelled, VMT)



SOURCE: FEDERAL HIGHWAY ADMINISTRATION

saturation would occur at 1 vehicle per household were surpassed in the United States in the 1930s. Then, a proposed saturation point of 1 vehicle per worker was surpassed in the mid-1960s. Expected saturation of 1 vehicle for each licensed driver was surpassed in 1983.[26] And for the past 30 years, VMT per vehicle has remained at about 10,000/year, driving total U.S. VMT upwards at the rate of expansion of the fleet.[27] The year-by-year rise in travel faltered only twice, and then only for very brief periods when gasoline supply problems were coupled with very sharp price increases.

More than half of the increase in VMT over the past 15 years can be attributed to the increase in the number of adults of driving age; the remainder was due to the growth in driving per licensed driver and the higher proportion of licensed drivers in the population -- the latter due largely to the growth of women in the workforce.

The Energy Information Administration's recent 1989 Annual Energy Outlook[28] projects personal travel by autos and light trucks to grow at 2.1 percent/year for the 1988-2000 period, reflecting their judgment that the market for such travel will slow somewhat from its steady rate of the past few decades. Other recent forecasts by Argonne National Laboratory, Energy and Environmental Analysis, Inc., and the Federal Highway Administration[29] show 1985-2000 growth rates for the light duty fleet of 2.27 percent, 2.75 percent, and 2.13-3.14 percent, respectively -- higher than EIA's rate but also generally below the recent trend.

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[26] Patterson, P.D., "Analysis of Future Transportation Petroleum Demand and Efficiency Improvements," IEA Energy Demand Analysis Symposium, Paris, France, Oct 12-14, 1987.

[27] Ibid.

[28] Energy Information Administration, 1989 Annual Energy Outlook, DOE/EIA-0383(89), January, 1989.

OTA agrees that a decreased growth rate for travel is likely. However, there is considerable room for argument about the likelihood of a decrease, especially because of the stability of vehicle mileage trends in the past. Factors that will affect future VMT include:

women in the workforce. During the past few decades, the growing share of women working, and therefore needing to commute, has contributed significantly to rising levels of light duty vehicle travel. Between 1969 and 1983, the percentage of adult women in the workforce rose from 39 percent to 50 percent, and of those working, the percentage with drivers licenses rose from 74 percent to 91 percent. Further increases in the share of women working will continue to affect the demand for transportation services during the next few decades, but *probably* at a slower rate because the current percentage of working women is now high. However, women, working or not, still do not drive nearly as much as men; this leaves open the possibility that future shifts in lifestyles among women could drive VMT at a higher rate than predicted.

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[29] The first two forecasts are described in Patterson, P.D., "Analysis of Future...," op.cit. The growth rates were calculated from data obtained from the author. The last forecast is from Federal Highway Administration, The Future National Highway Program, 1991 and Beyond. Working Paper No. 2, Trends and Forecasts of Highway Passenger Travel, October 1987. For this last forecast, the cited growth rates are actually for 1983-2005.

number of adults. The rate of growth of adults of driving age will slow as the baby boom passes. After 2000, however, the rate of increase will depend on future birth rates, which are uncertain.

possible saturation among high mileage drivers. Employed men between 25 and 54 years of age drive more than any other large group -- about 18,000 miles per year. This represents an average of 1.5 hours per day spent driving. Although "common sense" about saturation of driving has been wrong before, it is at least possible that this group may be nearing saturation.

changing economic structure. The growth in part time work and the shift in the economy towards more services may lead to increased driving, by bringing more individuals into the workplace and by increasing delivery requirements. The potential for delivering certain types of services, especially information, electronically may eventually substitute for some transportation, but thus far such trends have not been observed.

traffic congestion. The increasing congestion of metropolitan areas will alter travel patterns. Congestion will decrease the fuel efficiency of those trips that are made; discourage other trips (or shift them to public transportation, or to the electronic media where possible); encourage some people to work closer to home or move closer to work; and encourage businesses to move to the less congested fringes, increasing travel requirements. The net effect on fuel demand is unpredictable.

In OTA's view, the most predictable aspects of the above factors are the lower number of persons reaching driving age and the likely slowdown of the effects of women entering the workforce, both acting to slow the growth in VMT. Nevertheless, the uncertainty associated with the various factors affecting travel demand probably allows a range of feasible growth rates of 2-3 percent *without* considering the potential for future price shocks. An unexpected large increase in gasoline costs, or supply problems, could cause the growth in personal travel demand to fall below these levels, or even to go negative.

LIGHT DUTY FUEL USE

The effect of a combination of moderate improvements in vehicle efficiencies and a steady but slightly slower increase in miles driven -- which OTA considers the most probable future for personal highway travel during the next decade -- will be that, absent policy changes, the fuel consumption of the passenger vehicle fleet is likely to change little between now and 2000; the expected efficiency improvements will approximately offset the expected increase in miles driven.

To be more precise, the fuel efficiency and vehicle miles traveled projections of the Energy Information Administration and Energy and

Environmental Analysis, Inc., cited above, imply that year 2000 fuel use by autos and light trucks combined will be, respectively, 2.6 or 2.2 percent higher than today's. This is a very small change for an 11 year period.

A projection of stagnant automotive fuel consumption is quite in line with the experience of the past decade and a half. Between 1973 and 1987, the in-use fuel economy of the U.S. automobile fleet improved from about 13.3 mpg to 18.2 mpg; light truck fuel economy improved sharply, as well. In 1987, this improvement amounted to a savings of about 1.8 mmbd over what oil consumption *would have been* had 1987 driving levels been accomplished with 1973 fleet efficiency[30] (at about $1.00/gallon, this equates to an annual savings to U.S. drivers of close to $30 billion per year); because mileage driven increased substantially during this period, the actual petroleum consumption of the fleet changed little, rising from 5.41 mmbd in 1973 to 5.70 mmbd in 1987.

Of course, alternative projections differ somewhat about this. For example, a recent Chevron forecast (World Energy Outlook, October 1987) projects a decrease in gasoline usage of 0.3 percent per year to the year 2000, whereas Conoco (Energy Outlook Through 2000, September 1987) projects a 0.5 percent per year *increase* in gasoline demand through 2000.

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[30] Depending on assumptions, the magnitude of the savings can be somewhat different. For example, a recent World Resources Institute report (J. Goldemberg, et al, Energy for a Sustainable World, September 1987) calculates the savings for 1975-1985 -- a shorter time period -- to be 2.4 mmbd. Although the difference is substantial, the point remains the same.

ATTACHMENT TO OTA RESPONSE TO QUESTIONS 8 AND 9
From: "The Fuel Economy Potential of the U.S. Automobile Fleet," Testimony of S.E. Plotkin, Office of Technology Assessment, to the Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives, July 12, 1989

6. *What impact would higher levels of fuel economy have on the technical ability of vehicle manufacturers to meet both existing emissions standards and stricter emission standards such as those proposed in President Bush's Clean Air package?*
7. *Conversely, if stricter auto emissions standards are enacted, how would that affect the fuel economy of new cars and light trucks?*
8. *If there is a trade-off between emissions and economy, are there ways to overcome that trade-off to get both? What do those ways cost?*

OTA has dealt with some of these issues directly, in its ongoing study on Catching our Breathe: Next Steps for Reducing Urban Ozone, and indirectly, in the auto fuel economy analysis portion of its ongoing study on Technological Risks and Opportunities for Future U.S. Energy Supply and Demand. We have drawn on contract reports from both of these studies[11] to help prepare our response. In particular, the report prepared for the Ozone study dealt specifically with the ability of automakers to comply with more stringent NOx and HC emissions, and the costs and other effects of such compliance, including effects on fuel economy. We have attempted to broaden our discussion beyond the results of these reports, however, by including material we have gleaned from the literature and from discussions with experts. Because these parts of the discussion are not yet part of formal OTA reports, they have not undergone our usual extensive review process. We have referenced these sources in each case in the testimony.

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[11] Sierra Research, Inc., The Feasibility and Costs of More Stringent Mobile Source Emission Controls, contractor report to OTA, January 20, 1988, from the Ozone study, and the Energy and Environmental Analysis, Inc. report cited earlier, from the Energy Supply and Demand study.

The above questions appear to focus on the possibility that the dual goals of improving fuel economy and reducing vehicular emissions may work against each other, and, indeed, the automobile manufacturers have claimed that more stringent federal emissions standards will interfere with their ability to meet fuel economy goals. Others claim, however, that the two goals are mutually reinforcing, and that improving fuel economy will yield emissions benefits. My discussion will examine this issue from both perspectives.

There is a complex relationship in automobile design -- sometimes involving tradeoffs, sometimes not -- among emissions, fuel economy, performance, driveability, and cost. In pursuing lower emissions, the automakers may choose from several technologies that have different costs and fuel economy impacts, as well as varying impacts on performance and other vehicle attributes. And many of the strategies to increase fuel economy, especially those that involve new engine designs, can have either adverse or positive effects on emissions, performance, and other vehicle attributes and will vary significantly in cost. All of these relationships can change with time as new technologies are developed and as designers learn more about fine-tuning existing technologies.

The potential strategies to achieve lower emissions or better fuel economy are too numerous, and their precise effects too poorly understood, to allow a definitive estimate to be made of the tradeoffs and other relationships among fuel economy, emissions, other vehicle attributes, and costs. However, there is sufficient past experience and recent analysis to allow us to enumerate some general conclusions:

a. *With two exceptions, achieving improved fuel economy will not automatically reduce vehicular emissions and improve air quality. The exceptions are emissions of carbon dioxide and uncontrolled refueling hydrocarbon emissions, both of which vary directly with the amount of fuel consumed.* Some advocates of efforts to improve the fuel economy of the U.S. fleet have claimed that lower emissions will be an important benefit of such an improvement. This claim stems from the arguments that, first, carbon monoxide and hydrocarbons, being the product of inefficient combustion, will be reduced when engine efficiency improves, and, second, burning less fuel should naturally result in producing less pollution.

The problem with claiming "lower emissions from better fuel economy" is that there are a number of factors that either weaken the link between emissions and fuel economy or else that connect improved fuel efficiency to a net gain in (regulated) emissions rather than a reduction:

- *Catalytic converters*. In particular, the use of catalytic converters substantially complicates the relationship between fuel use and emissions in today's vehicles. For example, three-way catalytic converters require particular conditions of oxygen content in the exhaust, which in turn means that certain strategies to improve efficiency, such as running the engine "lean" (low fuel/air ratio), will interfere with catalyst effectiveness or force adjustments in the emission control system that could add to emissions.

- *NOx and efficiency.* Another factor to be reckoned with is the very complex relationship between efficiency and nitrogen oxides, NOx. Efficiency may be gained by operating engines at higher temperatures; this tends to increase NOx production. Other strategies to control NOx, such as exhaust gas recirculation, could have an effect on fuel economy.
- *Effects of reduced engine displacement.* Also, efficiency may be gained by reducing engine displacement, either coupled with power enhancement measures such as turbochargers or with non-engine changes such as downsizing that allow the use of a smaller engine, or simply accepting lower performance. Hydrocarbon emissions tend to be a function of the area/volume ratio of the cylinders (as well as a variety of other factors), because combustion may be partially "quenched" (extinguished) -- and hydrocarbon emissions increased -- at the cylinder walls. Because small engines have higher area/volume ratios *if* they have smaller cylinders, maintaining low hydrocarbon emissions is more complicated for these engines despite their lower fuel use. Engine designers

limit this problem by limiting the minimum size of cylinders and favoring fewer rather than smaller cylinders.[12]

Where lower power is accepted, the engine may have to burn a richer fuel mixture when better performance is required, e.g. for rapid acceleration or hill climbing. This further complicates hydrocarbon emission control.

- *Highway versus city fuel economy and emissions*. Several important technologies to improve fuel economy -- lock-up transmissions and improved aerodynamics -- act primarily on highway travel and have little or no effect on fuel economy at low, urban speeds. Because regulated emissions from controlled vehicles during highway travel tend to be very low compared to the emissions during warmup and stop-and-start driving, changes in fuel use during highway travel would have little effect on total vehicle (regulated) emissions.
- *Exhaust vs. evaporative emissions*. Improved controls on engine exhaust emissions have reduced these emissions to the point that evaporative emissions are playing a greatly increased role in total vehicular emissions. Most existing measures to improve fuel economy have no effect on evaporative emissions, and therefore the relationship between fuel economy and total vehicle emissions is weakened. On the other hand, controls that capture and recirculate evaporative emissions to the engine may gain a small

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[12] Personal communication, Carl Hellman, U.S. Environmental Protection Agency, Ann Arbor, Michigan.

efficiency benefit as a result, balanced against the negative effect of the control system's weight.

The exceptions to the rule about the unclear link between emissions and fuel economy are emissions of CO2 and evaporative hydrocarbon vapors emitted during refueling. Both vary in lock-step with the amount of fuel burned. Refueling emissions can be controlled with available technology, whereas CO2 emissions can not now be controlled.

b. Stricter emission standards can affect the fuel economy of new cars and light trucks, but the net effects are not always easy to sort out even after the fact. For proposed new standards, technologies for emission control exist that would cause little fuel economy loss in today's engines; but some potential control strategies would meet the standards at lower first cost but with a fuel economy loss. In the long term, with new engine technologies possibly entering the fleet, effects of new emissions standards on fuel economy are difficult to predict, but could range from strongly negative to strongly positive depending upon how the new standards affect the process of moving the new technologies into the fleet. Because some of the more interesting new fuel-efficient engine technologies appear to have emissions problems, stricter emissions standards conceivably may delay or prevent commercialization of these technologies. Conversely, a need to cut emissions drastically could promote the use of alternatives to gasoline, for example electricity or hydrogen.

If proposed new federal standards on exhaust hydrocarbons and nitrogen oxides are enacted, manufacturers will choose among alternative strategies that will trade off cost, fuel efficiency, and emissions, in addition to other vehicle attributes such as power and driveability. Historically, manufacturers pursued a variety of strategies to meet new standards, with varying effects on fuel economy. To meet the 1981 emissions standards, for example, many Japanese manufacturers chose to use oxidation catalyst technology and accepted a fuel economy loss of several percent.[13] General Motors met the same standard with "closed loop" electronic fuel control systems with three-way catalysts that incurred no efficiency loss.[14] Also, time is an important factor; the companies have generally managed to reduce or overcome fuel economy penalties within a few years after new standards have taken effect, by "moving up the learning curve."[15]

An important caution in gauging the effect of emissions standards on fuel economy is the need to understand the concept of fuel economy *foregone*. Some analysts have attempted to measure the effects of more stringent emissions standards on fuel economy by comparing the "before" and "after" fuel economy of vehicles subject to these standards, and concluded that there was no effect when there has been no degradation of fuel economy. This does not tell the whole story. Some automakers complied with the standards by adding new technologies, such as multipoint fuel injection or improved combustion chamber design, which have a positive impact on fuel economy in addition to their potential to lower emissions. Here, the "after" fuel economy may be as good as or better than the "before," but the addition of these technologies *in the absence of stricter emissions standards* may have allowed the achievement of even higher fuel economies. Thus, some potential for higher fuel economy has been foregone *if the technologies would have been introduced without the impetus of the emission standards*. The latter point is critical, however. If the technologies would have been introduced much later, or even not used at all, had not tighter emissions standards provided the incentive, no loss in fuel economy should be claimed. Unfortunately, it is rarely possible to determine whether or not the technologies would have been introduced without the standards.

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[13] Energy and Environmental Analysis, Inc., OTA contractor report, op.cit.

[14] Ibid.

[15] Ibid.

An OTA contract analysis by Sierra Research, Inc. of Sacramento, California[16] concluded that emission standards of .25 grams/mile for hydrocarbons and 0.4 grams/mile for NOx -- stricter than the Clean Air standards recently proposed by the Administration (.25 grams/mile for hydrocarbons, 0.7 grams/mile for NOx) -- could be achieved without a significant change in fuel economy if all automakers turned to strategies focusing on catalytic control. Specifically, most vehicles would require multipoint fuel injection, bypassable start catalysts, and increased rhodium loadings in three-way catalysts. *The cost of the start catalyst and increased rhodium loading was estimated at $139 per vehicle.* Sierra estimated the costs of the standard recently proposed by the Administration at $61 per vehicle.

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[16] Sierra Research, Inc., The Feasibility and Costs of More Stringent Mobile Source Emission Controls, contractor report to OTA, January 20, 1988.

These conclusions apply to achievement of the stricter standards during certification testing only, *not* necessarily during customer service. Several factors, including the lack of adequate control over gasoline fuel quality and the possibility that actual driving patterns may stress the catalyst more than EPA's calculations predict, cause an offset between the emission levels that can be achieved during certification testing and the levels that can be achieved in customer service, even from properly maintained vehicles.[17]

I have some concern about Sierra Research's conclusion that there will be *no* significant effect on fuel economy caused by the stricter standard. There is a possibility that vehicles currently equipped with multipoint fuel injection may lose a small increment of fuel economy, and vehicles that must switch to multipoint injection may forgo a portion of the *potential* fuel economy gain associated with adopting this technology. This possibility arises because tighter emissions standards will require exhaust conditions to be more precisely matched to the needs of the catalyst, and thus may cause some flexibility in selecting fuel control strategies to be lost. This flexibility, allowed by the current emissions standards, permits vehicles equipped with multipoint fuel injection to maximize fuel savings by using precise fuel control to match driving conditions.[18]

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[17] Ibid.

Sierra Research also notes that some manufacturers could elect to employ retarded spark timing in order to reduce NOx and HC emissions without making significant changes to the catalyst system. This strategy would reduce fuel economy, but reduce first costs to the manufacturer. The decision about which strategy to pursue would presumably be influenced by the presence or absence of new federal fuel economy standards.

Over the long term, stricter emission standards -- *among a great number of factors* -- could affect the introduction of new engine technologies. For example, advanced diesel engine technologies and the improved two-stroke engine have emission problems that conceivably could limit or prevent their introduction in the face of stricter standards. Also, the introduction of methanol as a transportation fuel, offering an alternative to oil use as well as improved fuel efficiency, could be delayed by significant tightening of NOx emission standards. On the other hand, introduction of any technologies that offered *both* fuel economy improvements and emissions reductions might be accelerated by stricter emissions standards. And if growing urban air pollution problems require drastic reductions in emissions that are unattainable with internal combustion engines burning fossil fuels, this would greatly encourage the introduction of alternatively-fueled vehicles, for example vehicles fueled with electricity or hydrogen.

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[18] Personal communication, K.G. Duleep.